Facilitating the Competitive Advantage:
An implementation of the Amanda Portal System for OPEX Communications.

Introduction:

OPEX Communications (www.opexld.com), based in Elk Grove Village, IL has been providing high quality communication services to consumers since 1998. OPEX communications has sustained growth in each year of operation despite the general downturn in the telecommunications services industry. OPEX company leadership cites aggressive implementation of business automation as a key factor in the company's long term success.

The installation of the Amanda Portal system is the latest in a long line of innovative technology applications designed to enhance operational efficiency for OPEX.

Technology Application Background:

OPEX communications can be classified as a retail long-distance service provider. In the present business model of OPEX, interconnect services are obtained at wholesale rates from companies that own specific infrastructure and resold by OPEX at retail rates to the end user of this infrastructure. OPEX itself does not own or operate the systems that are used by their customers to place long-distance calls or access the Internet. This business model is often referred to as *Switchless Reseller* by those familiar with the telecommunications industry.

Tom Jacobs, CEO of OPEX breaks down the company's cost of service provision as follows:

- Carrier Access
- Billing / Collection
- Customer Service
- Bad Debt

OPEX has focused on reducing its cost of doing business through the carefully measured application of technology to the three cost areas that are directly within their control; Billing/Collection, Customer Service, and Bad Debt.

In addition to reducing operational costs, OPEX has used technology to market its services to end-users through the Internet, and to empower its independent sales agents with support systems that eliminate operational inefficiencies that are common to the industry.

Examples of innovative technology application by OPEX and their measured result are given below.

Service Area:	New Customer Acquisition
Primary Application	Internet
Innovation	Affinity Marketing
Result	95% of new customers come through the Internet.

Service Area:	Agent Support
Primary Application	Internet
Innovation	Automated Provisioning
Result	Successful New Customer Provisioning Rate of 92% compared to industry average of 68%

Service Area:	Billing
Primary Application	IDI Cost Guard
Innovation	Credit Card Payment Processing (In house developed extensions to the commercial CRM system)
Result	Customer service call rate on billing questions dropped to 5% from 30% of calls.

Service Area:	Customer Support
Primary Application	Amanda@Large.Office / IDI Cost Guard
Innovation	IVR telephony interface to customer financial records.
Result	Average customer service call below two minutes.

Service Area:	Bad Debt
Primary Application	Internet (Service Provisioning)
Innovation	Fraud Prevention Customer Defined Account Limits
Result	Bad debt rate kept below 4% of sales.

From a broader perspective, OPEX leadership has an operational focus on expanding the customer base without adding personnel to the support areas. The chart below shows the company's long-term success in achieving that goal.

CHART ONE HERE:

Olivia, The Automated Support Agent:

A natural outgrowth of the company's commitment to applied technology and excellent customer support is the concept of an Automated Support Agent. An Automated Support Agent as envisioned by the OPEX leadership can be described as a natural language telephonic interface to an expert system that will provide answers to OPEX customer questions and resolutions to operational problems. OPEX refers to this Automated Support Agent as *Olivia*, since the key requirement of the Automated Support Agent is a user friendly, natural language interface. Olivia is the overall objective of the present technology upgrade undertaken by OPEX.

To facilitate this overall outcome several important improvements to the OPEX business technology will be required. In addition, growth in the OPEX customer base has required the expansion of the company's present communication and support systems. Taken together, these improvements to the current OPEX customer support system, and the realization of Olivia provide the total scope of the project.

Phase One: The Foundation

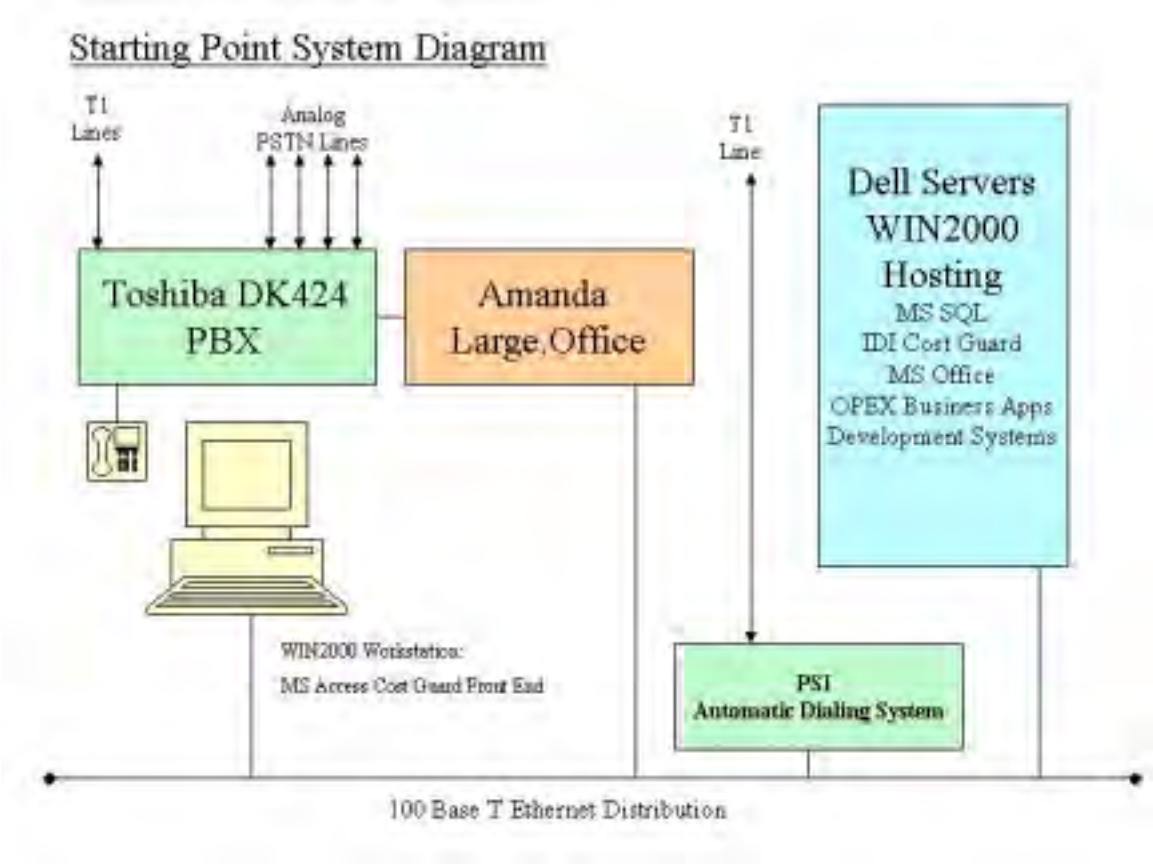
Growth in the OPEX customer base has necessitated the following improvements in the current customer support system, as it relates to the Amanda@Large.Office / IDI Cost Guard / Toshiba PBX integration. (Note: Amanda@Large.Office is currently sold as Amanda@Work.Group Windows.)

- Expansion of the messaging system to accommodate the addition of incoming lines, and to provide PBX functionality to relieve growth pressure on the existing Toshiba PBX system.

- Improvement of Amanda@Large.Office IVR interface to customer database.

- Provide the ability for the automated collection system to leave messages on answering machines and to properly route an answered collections call to an appropriate OPEX customer care representative.

The starting point system diagram for the phase one improvements is illustrated below:



In the starting point configuration the incoming line capacity of the Toshiba PBX was at its maximum. In addition, the IVR interface from the Amanda@Large.Office messaging system was being taxed by the growing volume of calls, and the outbound calling module for the PSI automated dialing system required features that were presently unavailable.

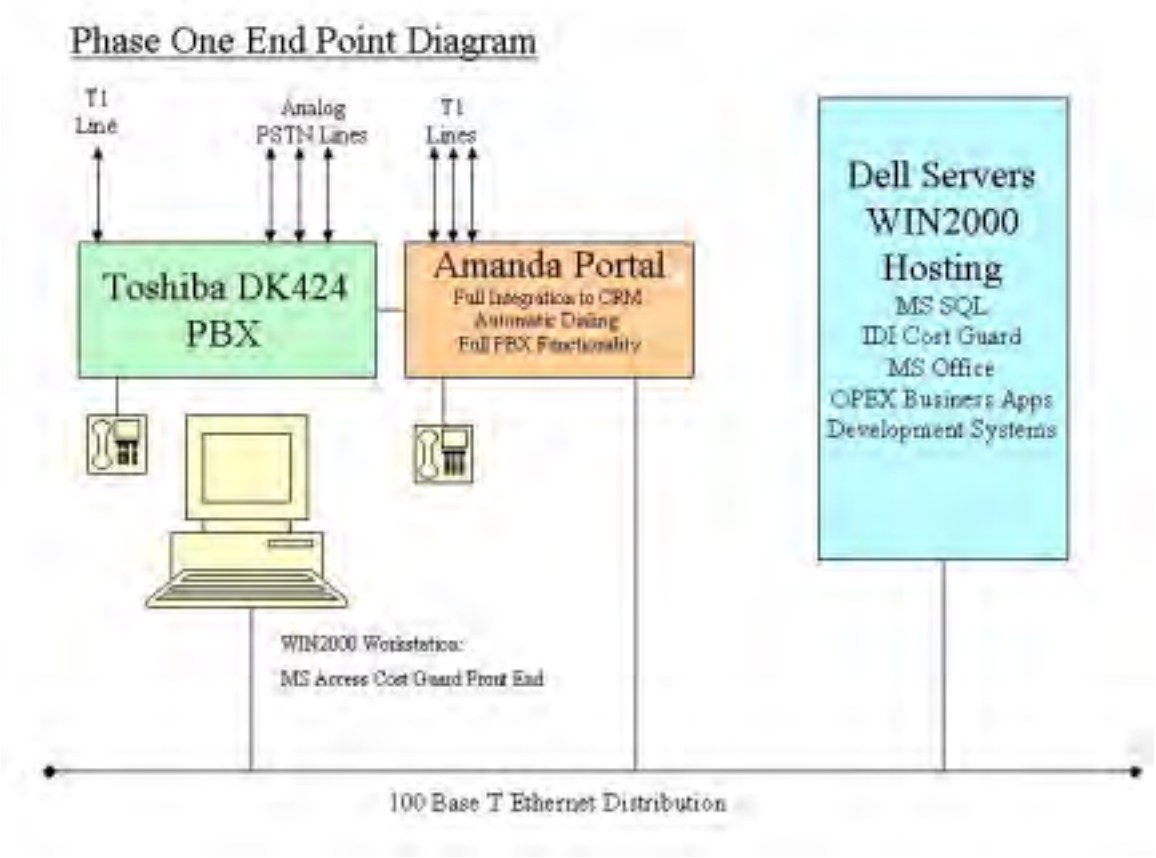
At the starting point, the Amanda@Large.Office messaging system was integrated to the IDI Cost Guard CRM system using a look-up method based on unindexed comma delimited ASCII (CDA) files. In a daily process the CDA file was created by the billing system and stored in the server so that an OPEX customer could retrieve certain account information by entering their account number from the telephone key pad. This integration method served well for about two years, but began to slow down as the size of the unindexed CDA file continued to grow. To support the growing number of OPEX customers, a direct interface to the customer data stored in the MS SQL server was needed.

Another Amanda@Large.Office IVR application was used to accept credit card payments from OPEX customers in a process that verified the account balance stored in the CDA file, and accepted credit card numbers entered from the telephone keypad. Also, prospective customers for OPEX long distance could get an automated quote on per minute rates by entering the prospect's phone number on the keypad. These key integration features had to be preserved in the system upgrade, and also be provided continuously during phase one implementation.

In addition to required improvements to Amanda@Large.Office, several important required features were unavailable on the existing PSI automated dialing system. The PSI system is used by the collections department to place calls to subscribers with past due accounts. The current system was unable to leave

voice messages on calls that were answered by answering machines, and there was no ability to automatically connect an answered call to a customer care representative.

The application of an Amanda Portal system directly addressed all of these immediate requirements in Phase One, while providing the necessary hardware infrastructure to support the development and deployment of the Olivia automated service agent. The system diagram for the end point of Phase One is show below.



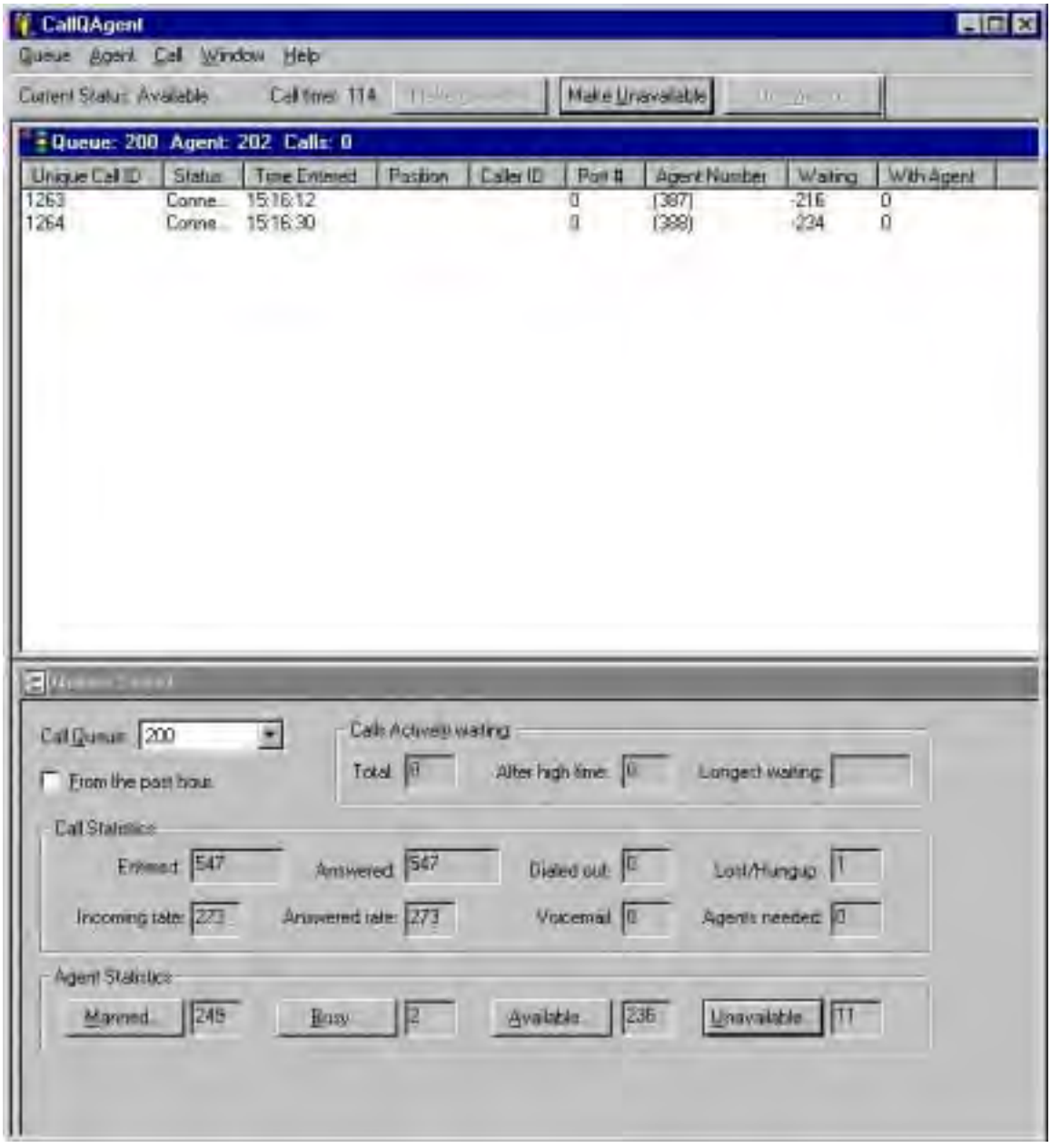
The Amanda Portal Single Server Solution:

The replacement of the existing Amanda@Large.Office system with the Amanda Portal system offers OPEX a single server solution to their entire set of requirements for this project. Serving as a PBX, messaging system, automatic dialing system and voice to data integration platform, the application of the Amanda Portal system eliminates the need to upgrade the existing Toshiba PBX, and replaces the underperforming PSI automated dialer. In addition, full direct access to the IDI Cost Guard CRM database through ODBC opens the door to more robust integration features and provides support for the speech recognition and natural language voice response required for the Olivia automated service agent.

The implementation of Amanda Portal enhanced the flexibility of the customer care operations in several important areas. Initially, the Toshiba PBX provided for a maximum of two inbound call queues. These call queues were assigned to collections and customer care. Call queues for supervisors in these areas were unavailable, and calls to supervisors could not be transferred if the supervisor's extension was busy or otherwise unavailable. Since Amanda Portal supports the creation and maintenance of an unlimited number of call queues, calls to supervisors can now be transferred and queued for service, even if the target extension is in use.

In addition, Amanda Portal provides much greater flexibility in the control of queued calls. For example, both agents and supervisors can monitor queued calls through Amanda CallQAgent that runs on all customer care workstations. CallQAgent shows real time queue statistics allowing supervisors to assign customer care agents based on current demand. As seen below, an estimate of the number of agents required to cover the current call load is always available to supervisors.

Amanda Portal CallQAgent Window



Calls that are not answered within the designated time period are transferred to Amanda Portal so the caller can leave a message. Amanda Portal simultaneously provides messaging service for all calls placed to OPEX whether originating from the directly connected T1 lines, or from the Toshiba PBX. Customer care extensions serviced by Amanda Portal can be dialed directly from Toshiba PBX extensions by dialing

Amanda Portal and then entering the extension number. This provides simple, logical integration with the existing operations.

The following is an inventory of service accomplished in phase one of the project.

Installation of Amanda Portal

- Connection of the Amanda Portal system to new T1 lines provided by Global Crossing required full system testing to be sure of the correct interoperability with the central office switch. GlobalCall software device drivers were used to support the DMS version of the ISDN service provided to OPEX by Global Crossing. Amanda Portal fully supports both the DMS and 4ESS versions of ISDN.

  BENEFIT: Added incoming line and PBX capacity to the customer care center. Relieves congestion on the Toshiba PBX. The toll free customer care numbers were transferred to the new lines which are answered by Amanda Portal, and processed by the customer care center. This will allow the existing Toshiba PBX to be dedicated to non customer service related business communications.

- Connection of the system to wiring distribution centers to support analog telephones at customer care workstations.

  BENEFIT: New wiring to the customer care workstations allows for the addition of standard analog phones that are directly to connected to Amanda Portal. This will free the existing phone sets to be reused in other business units. In addition, the overhead of supporting customer care calls is removed from the existing Toshiba PBX

- Installation and configuration of PickUpS software and modification of the Amanda Portal software to support automatic screen pops on the IDI Cost Guard software used on customer care workstations.

  BENEFIT: The number of the calling party is used by Amanda Portal in an automatic record look-up procedure that uses the ODBC interface to IDI Cost Guard. Amanda Portal captures this input and transfers it to PickUps, which, in turn transmits it to the customer care workstation before the call is answered by an agent. If the ANI of the calling party is found in the database, then the data for that customer is sent to the customer care agent. If the ANI is not found through the automatic look-up process, the caller is asked to enter the account number or phone number from the telephone keypad. The financial record of the customer is thereby automatically displayed on the customer care workstation prior to connecting the call.

- Configuration of ODBC device drivers to support direct access of Amanda Portal to the MS SQL database.

  BENEFIT: ODBC access allows direct interaction between Amanda Portal, the IDI Cost Guard CRM system, and other company databases that are stored in the open SQL data format. Cost Guard stores customer financial and support records in an open SQL structure. Amanda Portal can access these records on a real-time basis without the need for any intermediate record processing.

- Configuration of the automatic dialing feature to support the OPEX bill collection process.

  BENEFIT: Direct ODBC access to IDI Cost Guard allows Amanda Portal to place outbound collection calls to delinquent accounts automatically. These calls are processed daily, answered calls are routed to a customer care agent automatically, and messages including the current outstanding balance are left on the customer's answering machine if required.

Customer Care Workstations

- Installation of analog telephone sets for customer care agents.

  BENEFIT: Allows customer care workstations to connect to Amanda Portal through analog telephone sets. New analog telephone sets offer simplified operation over previous proprietary desk sets. For example, transfer of calls to supervisor can be accomplished with two keystrokes.

- Installation of Amanda Portal call queue agent client software.

  BENFIT: Call Queue software allows the customer care agents to survey the call queue to see the account number and call status of the customer calls in the call queue. This allows for greater flexibility by the agent in answering a specific call in the queue.

System Performance Testing and Operational Verification

- Maintain all customer care service capabilities during the phase one installation.

BENEFIT: An important aspect of every new system installation or upgrade undertaken by The Amanda Company is seamless provision of service during the installation period. Failsafe recovery methods are employed to provide a return normal operations status in the event of an unforeseen system problem during the installation period. All aspects of the operation of the new or upgraded system are verified to be operating correctly before the technicians leave the installation site.

Phase Two: Using the platform to develop Olivia

There are three critical components required for the successful deployment of the automated support agent. The first is speech recognition, the second is an expert system that provides answers to frequently asked questions and resolutions to common problems. The third is a friendly, natural sounding voice that will be used to deliver the answers that are found in the expert system. All three of these components must be mature and robust in their feature set to be used to in the system.

Speech Recognition

This system will be used to accept voice input from callers and pass them to the expert system in the form of text. The Amanda Portal system can interface to several speech recognition systems that are well established in the industry. An analysis of the available speech recognition platforms to be integrated with the Amanda Portal system will be conducted with special consideration to these three areas:

- Proven Efficacy
- Method(s) of System Integration
- Acquisition Cost

Expert System

This system will be used to accept input from the speech recognition system, query the solutions database and provide the correct answer or problem resolution. The information required to build this expert system exists currently and is based on the company's 14 years experience in customer support. In order for the current information to be useful to the Olivia project, it will need to be organized properly and stored in a format that will allow it to be accessed by the incoming text string that will be converted from the callers verbal query.

The key factor for success here is the data structure that will support the system. The system must be flexible in its ability to accept input from the user, since in natural speech a single question my be phrased in myriad ways. The ability of the system to deal with an open query structure will be fundamental to the success of the system. Commercial solutions may also be available for this area of the project.

Voice Response

In order for the Olivia automated support agent to be accepted by a caller, the responses from the system must be delivered in a voice that is friendly and natural sounding. Given the present state of synthetic speech, the best option for this component is probably pre-recording, rather than synthesizing the responses. Pre-recorded responses offer the company the advantage of carefully selecting a speaker that will represent the spirit of the company and enhance the recognition of the OPEX brand. While this is the least technically demanding portion of the Olivia project, it is critical to the overall success of the system, and careful consideration will be given to the selection of the speaker for the voice response system.

Conclusion:

OPEX communications is committed to the constant improvement of their business operations, and the continued growth of the customer base. The addition of the Amanda Portal system offers a single server solution to meet their current and future operational requirements. Serving as a PBX, messaging system, automatic dialing system and voice to data integration platform, the application of the Amanda Portal system eliminates the need to upgrade the existing Toshiba PBX, and replaces the under performing PSI automated dialer. In addition, full direct access to the IDI Cost Guard CRM database through ODBC opens the door to more robust integration features and provides support for the speech recognition and natural language voice response required for the Olivia automated service agent.