

# Implementing Oracle Voicemail & Fax

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# Implementing Oracle Voicemail & Fax

## INTRODUCTION

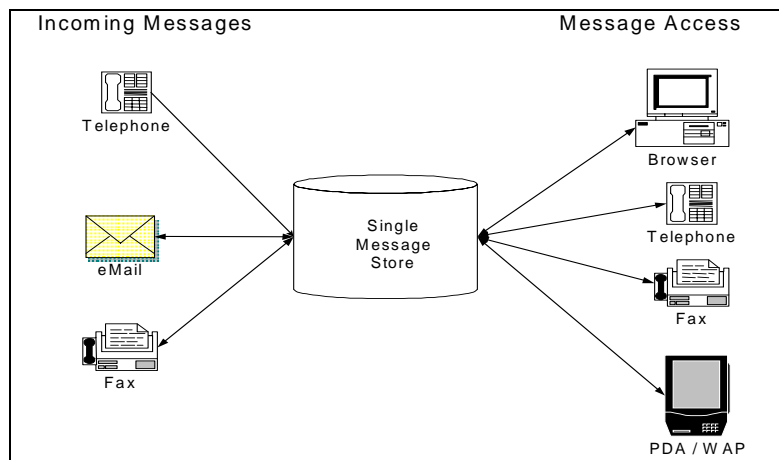
The ability to use general purpose computing infrastructure, hardware, networks, and languages for telephony applications is already starting to revolutionize how people think of devices, applications, and networks. Oracle Collaboration Suite provides many components that facilitate communication and collaboration across an organization. The Oracle Voicemail & Fax component of the Oracle Collaboration Suite leverages the data world to provide scalable, reliable, voicemail and inbound fax. Voicemail and fax applications are built on converged platforms using standard interfaces while voicemail messages are stored in the industry leading Oracle9i database.

This paper will examine a number of implementation questions and deployment strategies for Oracle Voicemail & Fax. Readers are assumed to be familiar with the Oracle Voicemail & Fax Technical White Paper available on the Oracle Technology Network.

## WHAT IS ORACLE VOICEMAIL & FAX

Oracle Voicemail & Fax provides a basic DTMF (tone based) based voicemail interface. Voicemail and faxes are stored directly in the user's inbox as industry-standard MIME-compliant messages with .wav (voice) or .tif (fax) attachments that are configurable to different encoder types, and are easily rendered through GUI clients. Because Oracle Voicemail & Fax is a single store solution, actions taken on a message through the voice channel are visible through other channels (if implemented).

Oracle Voicemail & Fax is built on the Enterprise Computer Telephony Forum (ECTF) standards. These standards, collectively known as CT Server, define the infrastructure needed to build and support platform-independent computer telephony (CT) applications and allow Oracle Voicemail & Fax to easily integrate with a variety of enterprise and carrier class switches.



Single message store Email, Voicemail, and Fax system.

## ARCHITECTURE AND SYSTEM SOFTWARE REQUIREMENTS

Oracle Voicemail & Fax is one of the applications included with the Oracle Collaboration Suite. It takes advantage of a number of software infrastructure components from the suite, including Oracle Enterprise Manager-based management, the Oracle9i Application Server infrastructure, and the Oracle9i Database. Two major pieces are used extensively: the Oracle Email Message store and the Oracle Internet Directory. Though it is possible to implement Oracle Voicemail & Fax without GUI access, most organizations will probably choose to provide users with access to voicemail and fax messages through mail clients using the Oracle Email protocol servers and WebMail client.

### Oracle Email

Oracle Voicemail & Fax uses the Oracle Email message store as the store for all voicemail and fax messages. These messages are stored directly into the user's inbox using the Oracle Email PL/SQL application programming interface (API) to ensure delivery of voicemail messages across the IP network. Oracle Voicemail & Fax also uses Oracle Email PL/SQL API's to provide speedy access to all messages stored in the users inbox. Users have real-time access to the Oracle Database (Message Store) through the telephone.

GUI access to voicemail and fax messages is provided for through the same infrastructure as normal email traffic. Email messages are stored in Internet standard MIME format allowing rendering through any IMAP4 or POP3 mail client that supports multi-part mime messages. Besides providing message access, the WebMail client allows self-service access to Oracle Email and Oracle Voicemail & Fax user preferences including greeting selection and changing voicemail passwords.

## **Oracle Internet Directory**

Oracle Internet Directory is used to store all information about a user and their preferences as well as system information. Oracle Voicemail & Fax leverages user information/ preferences from Oracle Email and then extends the stored information to include voicemail-specific attributes such as site, greeting, access to fax, and phone number. System configuration information stored within the directory includes attributes such as system parameters (see Oracle Voicemail & Fax Administration Guide for more details), menus, prompts and other management information.

## **TELEPHONY PLATFORM**

Enterprise Computer Telephony Forum (ECTF) Computer Telephony (CT) Server implementations are available from a number of vendors. Oracle has certified Oracle Voicemail & Fax implementation on Intel's (Dialogic) CT Media server and associated hardware. Telephony servers (CT Media and associated hardware) are available from a number of Computer OEM's (COEM's) and voice / data integrators. Customers should feel free to work with their choice of server vendor and / or voice integrator based on their existing relationship and requirements.

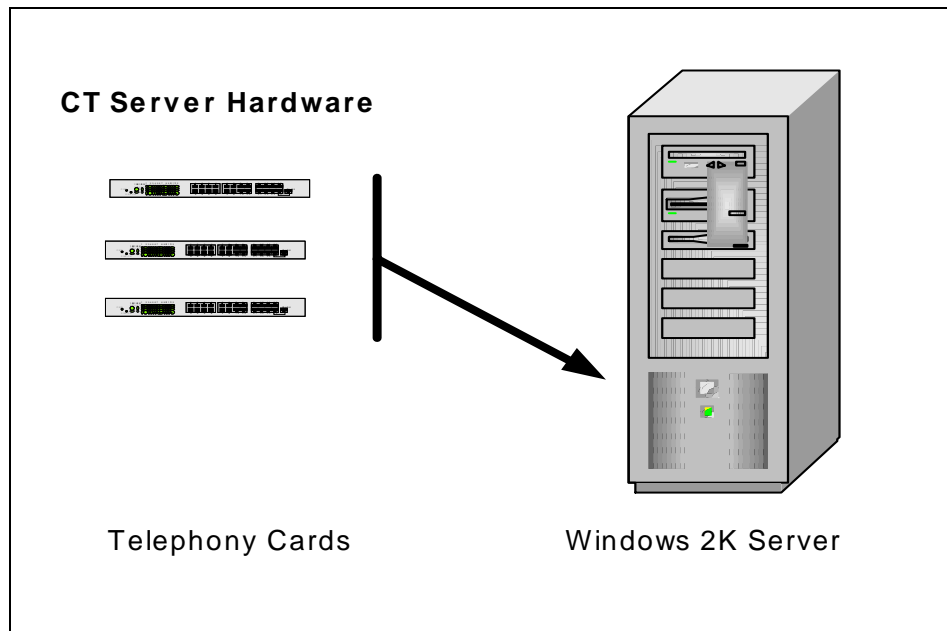
For a current list of specific vendors who are part of the Oracle Partner Network, see the Oracle Voicemail & Fax section of Oracle Technology Network.

The following sections contain additional details on CT server configuration and system requirements.

### **Server**

A typical telephony server configured for Oracle Voice Mail will have the following characteristics:

- Windows 2000 Professional OS
- Single processor or Dual Processor (3 or more telephony cards)
- Slots to support up to 6 cards (depending upon sizing and fax card needs)
- CT Media Server 2.1.1 from Dialogic
- Intel Dialogic Telephony Card(s)
  - Based on switch type to be supported
- Intel Dialogic Fax Resource Card(s) OPTIONAL



CT or Telephony Server Hardware

### Telephony / Fax Cards

Most telephone systems (PBX's) provide proprietary interfaces to integrate additional functionality such as Voice Mail systems. Intel / Dialogic provides telephony cards which support common telephone systems found in most enterprise and ASP environments. As Oracle's voice mail applications are written to the ECTF standards, there are no Oracle-specific PBX vendor requirements.

See the Oracle Voicemail & Fax section of Oracle Technology Network for a current list of telephone switches and the recommended telephony cards to be used for integration. If the switch you wish to support is not on the list, please contact Intel directly for additional supported switches as the list continues to grow.

The second type of commonly required card is a fax resource card. This card supports inbound faxes within your environment. Please note that Intel is currently in the process of enhancing this product line to support the newer PCI slot voltage standards (3.5 volts). Card availability may limit the number / type of server slots available for other services such as remote management.

### SIZING A VOICE MAIL SYSTEM

Oracle Voicemail & Fax should be sized based on the number of expected concurrent callers (callers recording, retrieving messages and receiving faxes). In practice we commonly see the following ratios on a per site basis:

Users	Users-to-Port Ratio
Under 100	20:1
100 – 400	30:1
400 – 2400	40:1
Over 2400	50:1

These ratios are provided as guidelines for sizing. Actual requirements will vary based on end users' roles and responsibilities. For example, a site with call center users who receive large numbers of voice mail messages may require a lower ratio when compared to a back-office site which receives little call activity. Where possible, usage statistics from existing or similar sites should be used to estimate the number of ports needed for an Oracle Voicemail & Fax installation.

### Common Port Configurations

The following configurations use the ratios above to determine the number of cards / ports needed for the number of users. Please note that these are estimates only:

# of Users	Configuration	# of Cards	# of Ports
< 400	Small	1	8
< 800	Medium	2	16
< 1200	Large	3	24
> 2400	HQ / ASP / Data Center	2 T1 or E1 Cards (if supported by switch)	48

Notes on Configurations:

- These are the minimum number of ports / cards needed to support the user population defined above
- Dual processor servers should be considered for implementations supporting three (3) or more cards in a single chassis.
- Additional cards can be added to the configurations up to the number of free slots available in any server (number of slots available will be dependent upon server hardware and options chosen).
- These estimates do not provide for fail-over.

### Sizing Implications for Oracle Email

This sizing methodology is specifically used for the telephony server. The message store and other components should be sized separately based on the combined requirements of email, voicemail and fax messages. Due to the much larger

number of emails users normally receive compared to voicemail and voicemail's much lower concurrency requirements, voicemail adds very little additional system resource requirements to a well-sized Oracle Email system.

	Email	Voicemail
Concurrent Users	1,000's	100's
Average number of messages a day	50-100 per user	2-4 per user

The addition of Oracle Voicemail and Fax *does* add to the operational uptime requirements of an Oracle Email system. Oracle9i Real Applications Clusters and/or Oracle Data Guard technologies should be seriously considered in order to ensure that user quality of service expectations are met. Additionally, high availability should also be a consideration when designing and implementing the Oracle Internet Directory infrastructure.

## ORACLE VOICEMAIL & FAX DEPLOYMENT ARCHITECTURE

Oracle Voicemail & Fax provides an extremely flexible architecture that allows organizations to implement voicemail and fax services in a completely consolidated or decentralized manner. The following sections discuss the considerations and give examples of each type of architecture.

### Voicemail Deployment Considerations

The architectural/ legacy choices of any Oracle Voicemail & Faxes implementation are driven by a number of factors. In many cases, the architecture will be dictated by an organization's overall messaging strategy (in many cases consolidation) as well as the need or desire to replace existing telephone system (PBX) infrastructure. Considerations include:

#### Switching Infrastructure

Many times, the decision on switching infrastructure drives the options available for voicemail implementation. As a media server application, Oracle Voicemail & Fax can support any combination of the following common switching options:

- Distributed Switching – Each office or site of an organization has its own switching infrastructure and direct access to the PSTN. This configuration is common in the United States CPE market. Implementing Oracle Voicemail & Fax in this environment replaces the voicemail solution already in place and re-uses existing switching infrastructure. Site sizes range from the very small office (e.g. sales offices with less than 50 users) to complete buildings or large campuses.

- Centralized Switching – In Europe and other parts of the world, centralized switching supporting multiple locations / regions is common. Implementing Oracle Voicemail & Fax in this environment also replaces the existing voicemail solution and can re-use the same switching infrastructure. These environments will normally have larger user populations.
- Centralized Voice over IP – Voice over IP (VoIP) implementations offer distributed offices the ability to appear as a consolidated environment without the need for new large telecommunications networks. Oracle Voicemail & Fax implementations can be centralized in the data center alongside the call control capabilities. Of course, a VoIP implementation may add additional complexities in new technology and network management.

### **Comparative Network Costs**

Another implementation consideration is the cost comparison between the traditional circuit switched network and the IP network. An organization with low-cost call providers may choose to route all calls to a centralized set of media servers rather than acquire the necessary IP network bandwidth to each site. Conversely, a company with a low-cost or well-developed IP network may decide to place media servers in each site or implement VoIP call transport in order to maximize efficiency of the general purpose IP: network. Cost considerations should be analyzed with an understanding of the organization's overall network strategy (circuit switched and IP) and VoIP strategy.

### **IP Network Considerations**

Quality of service (QOS) across the network is perhaps the largest issue with VoIP implementations and related telephony applications (such as Oracle Voicemail & Fax). When reviewing the IP Network infrastructure, organizations should take into account projected network bandwidth (size of the pipe), latency (pipe speed), and QOS (pipe congestion and performance during a call / application session). Running VoIP and / or Oracle Voicemail & Fax on the IP network may also impact the performance of other applications sharing the network. Care should be taken to evaluate the complete network traffic profile rather than individual applications when sizing the underlying network.

### **High Availability Considerations**

The Oracle Voicemail & Fax solution allows customers to implement the appropriate amount of availability for each site. High availability considerations

generally fall into three areas: telephony servers, the message store and the network.

### **Telephony Servers**

Storing messages in a central Oracle database rather than the telephony server itself, allows organizations to deploy redundant servers at a single site. In this configuration, telephone hunt groups (configured on the switch) provide both load balancing and backup / fail over capabilities should one of the telephony servers become disabled. Server vendors provide a number of high availability options and components allowing organizations to acquire hardware that meets their individual requirements.

While many organizations may choose to implement redundant telephony servers at larger locations, this may not be cost-effective at smaller sites. In this situation, organizations may want to consider centralizing both the switching and telephony servers in a data center. This has the added benefit of lower management and service requirements.

Service requirements and spares strategies are another important component when comparing the costs of a distributed vs. consolidated voicemail implementation. Depending upon the hardware vendor used and the location of the office, the cost of providing 2 or 4 hour response times and / or additional spares storage onsite may be prohibitive.

### **Message Store**

Oracle Voicemail & Fax utilizes the Oracle Email message store for voicemail and fax storage. Customers have the option of implementing Oracle9i Real Application Clusters as well as all Oracle Data Guard technologies for offsite business resumption and standby database capabilities. Please see the Oracle Email Technical White Paper for additional information on the Oracle Email Message Store.

Should the message store become unavailable, Oracle Voicemail & Fax will continue to accept voice or fax messages and queue them for delivery. Messages queued for delivery cannot be accessed until the database is available and delivery has occurred. Once the database is available, queued messages will be delivered automatically.

As Oracle Internet Directory is also an integral component of the Oracle Voicemail & Fax, high availability options should be considered when designing the directory implementation as well.

### **Network**

Oracle Voicemail and Fax is dependent upon the underlying network (circuit switched or IP). Organizations should review their network architectures for

single points of failure (even in multi-vendor environments) and aggregate bandwidth requirements.

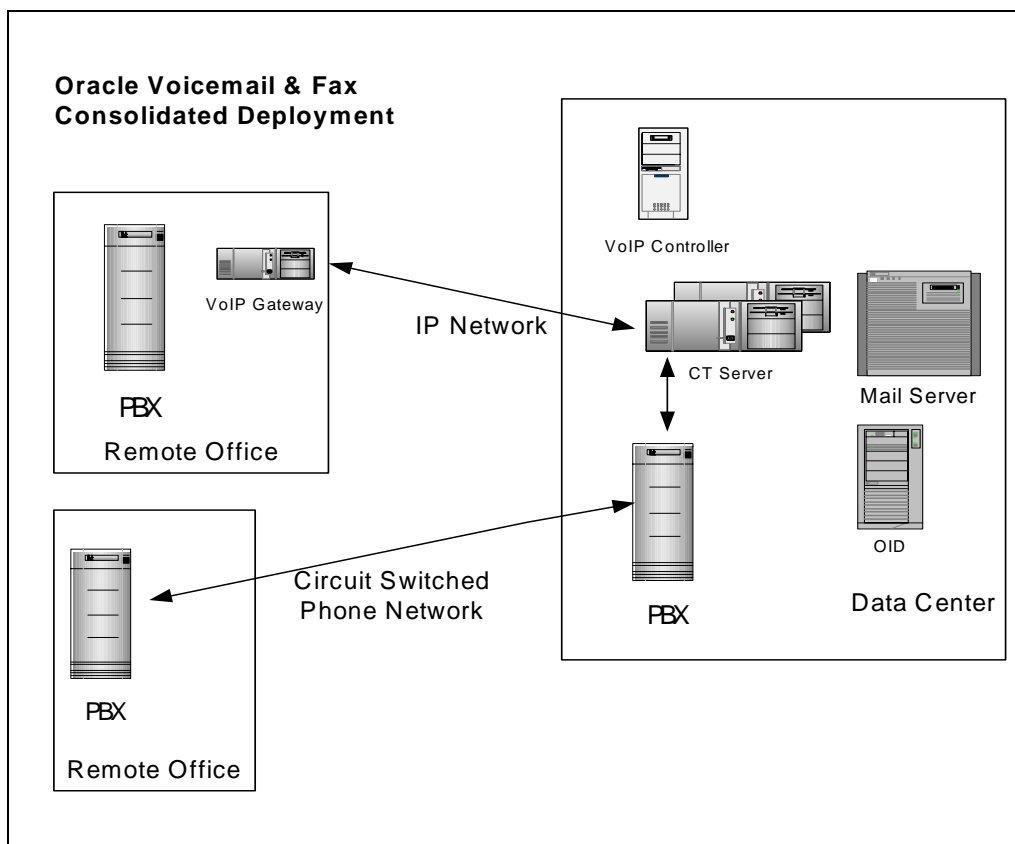
## Deployment Scenarios

The following sections describe the typical deployment architectures as well as the pros and cons of each.

### Total Consolidation

In this scenario, voicemail and email services are centralized in one data center supporting all components of the messaging solution. Telephony servers running the Oracle Voicemail & Fax applications are connected to one or more switches (regular PBX's or VoIP) that may exist either onsite or at other locations.

This scenario has the advantage of consolidating management and all infrastructure in one place. This lowers management, administration, and ongoing hardware support costs (spares management requirements are minimized) while also reducing to a minimum the cost to maintain hardware footprints in multiple sites.

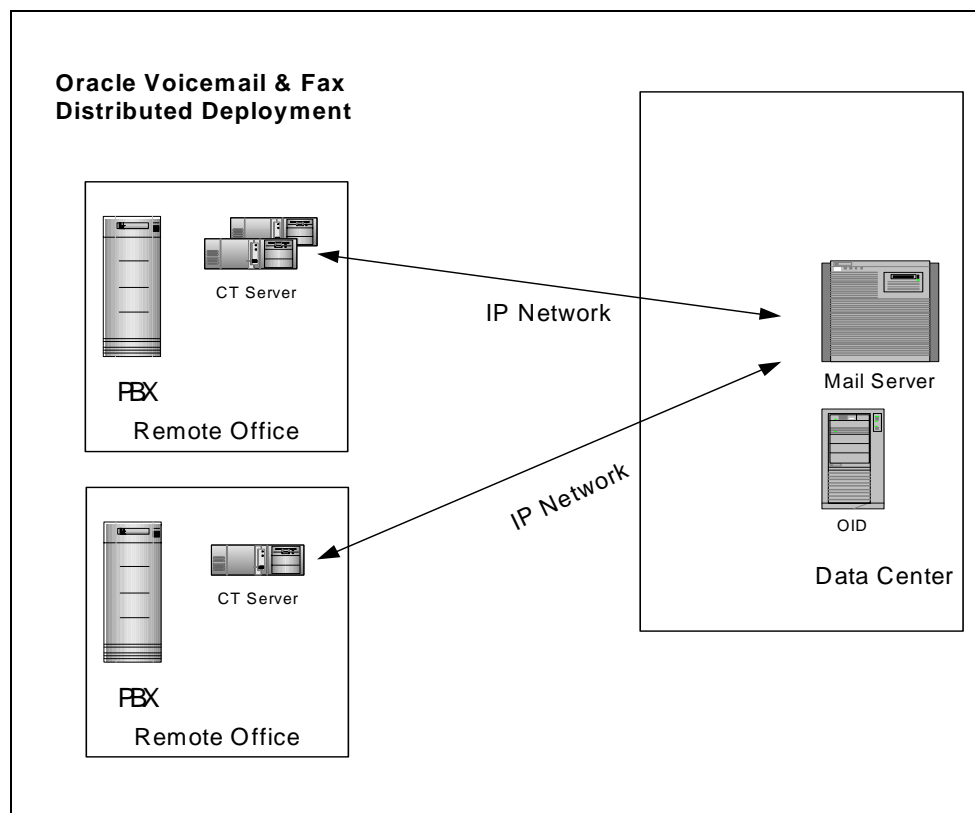


### Oracle Voicemail & Fax, consolidated deployment architecture

Total consolidation requires that all sites ship calls to the data center. This can be done over leased lines, the PSTN or over a (probably new) VoIP implementation. While conceptually the most pure, this option requires additional infrastructure costs that might not be appropriate for some organizations. Also note that when consolidating switching to support this approach, dial plans may need to be re-evaluated.

### Distributed CT Servers - Partial Consolidation

This scenario involves placing telephony servers in sites with their own telephone systems (circuit switched or VoIP). The telephony servers store and retrieve voicemail messages from a consolidated message store housed in a data center. The key advantage of this option is that it allows companies to keep their investments in existing switching technologies and leverage their IP network for messages movement between the CT Server and message store. No change in dial plan is needed.



Oracle Voicemail & Fax, distributed deployment architecture

While distributed telephony servers can be managed and administered from the data center, support and deployment costs are higher compared to the consolidated deployment due to the number of individual sites that must be supported.

### **Examples: Oracle Implementations**

Oracle has implemented Oracle Voicemail & Fax with a number of telephone systems supporting one consolidated messaging environment. Common examples of telephone system integration at Oracle include:

- Nortel SL100

This is a carrier grade telephone system in which both analog (individual telephone line) and line side T1 digital integration have been implemented. Call control information and Message Waiting Indicator (MWI) activation are provided through SMDI via a direct x.25 connection with the switch.

- Avaya G3

This common enterprise telephone system is integrated using digital set emulation where an individual voicemail telephone line appears like another telephone handset to the switch. Call control information and MWI activation are provided on the individual telephone line.

- Cisco Call Manager

This common enterprise Voice over Internet Protocol (VoIP) solution is integrated using digital set emulation capabilities. Call control information and MWI activation are provided on the individual telephone line. In this environment, the CT Server telephony card is connected directly to the Cisco interface without the need for additional hardware.

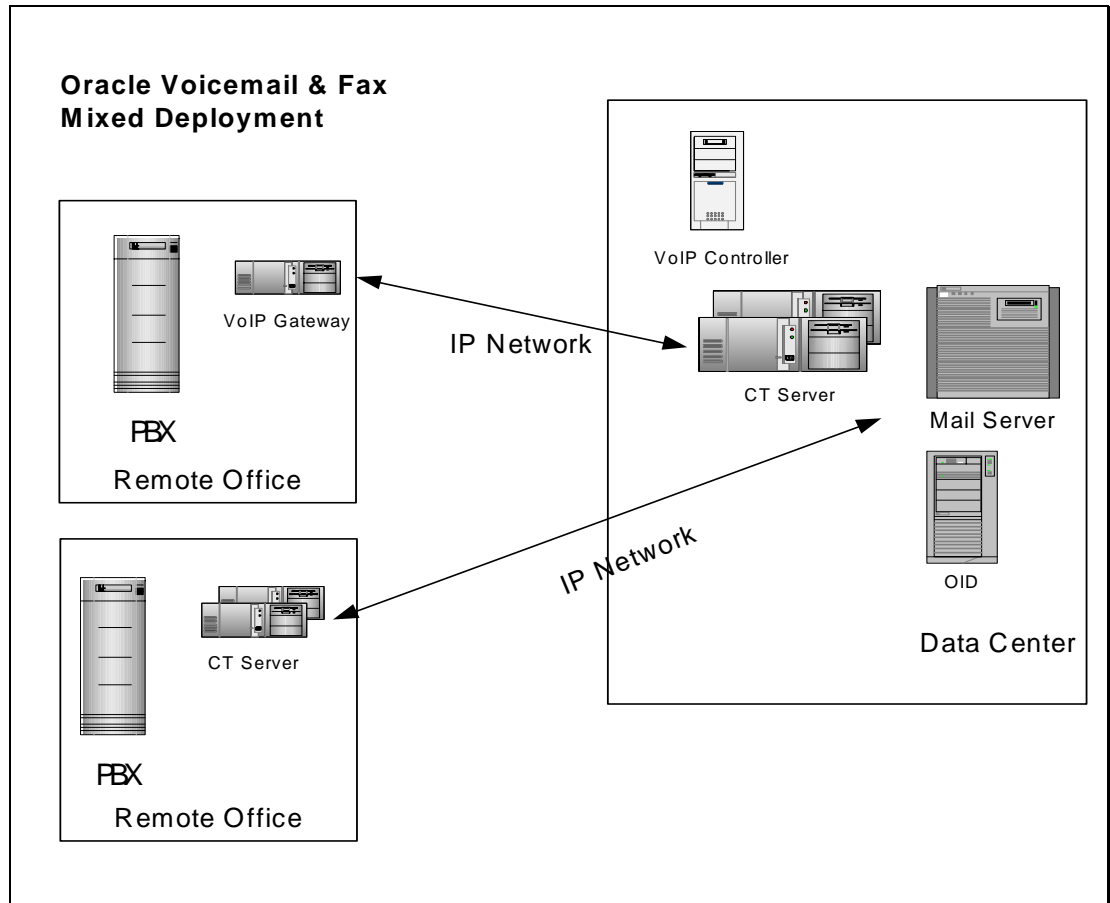
### **Oracle's Implementation Architecture**

Oracle initially implemented distributed telephony servers for a number of offices in the US and Europe (including Oracle Headquarters at Redwood Shores, CA, USA and Burlington, MA, USA) with a consolidated message store located at the corporate data center in Colorado Springs, CO, USA. This implementation approach was dictated by Oracle's need to support existing switching equipment and network architecture.

As Oracle has experimented with VoIP solutions, Oracle has moved to a centralized approach where many smaller offices are now supported by data center-based VoIP infrastructure and centralized telephony servers. These co-exist with distributed telephony servers serving larger US sites and the centralized

switching environments found outside of the US. All voicemail is accessed from the consolidated message store in Colorado.

The Oracle internal deployment supports over 8,000 users in six different locations around the world. Oracle will complete migration of over 18,000 users (mostly in the US) by end of calendar year 2002.



Oracle Voicemail & Fax, mixed deployment architecture

### SUMMARY

This paper discussed the various issues associated with planning and implementing Oracle Voicemail & Fax. Using standards based hardware and software; forward-thinking companies can reduce costs associated with their legacy voicemail mail systems while providing their users with time saving features.

Please check <http://www.oracle.com> and the Oracle Technology Network for additional information and details associated with Oracle Voicemail & Fax.



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