Track 1 - Infrastructure
Session 160

Integrating Third Party Software in the Composer Development Environment

Al Hill- NASD/Nasdaq

1996 Connect Annual Conference

May 15, 1996

Topics of Discussion

- ❖ NASD/Nasdaq Development Challenges
- ❖ Technical Architecture
- ❖ 3rd Party Products Being Used
- ❖ Lessons Learned
- ❖ Pros & Cons
- ❖ Summary
- ❖ Challenges Ahead

NASD/Nasdaq Development Challenge

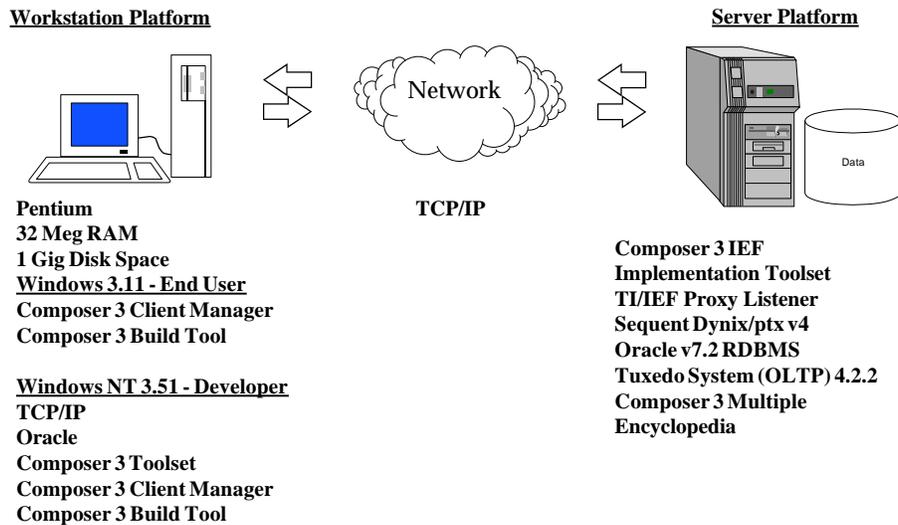| Project	Challenge
❖ Central Registration Depository (CRD)	❖ Greater than 20,000 remote users
	❖ Must support advanced reporting and GUI features
	❖ Utilizes a DBMS of over 70 gigabytes
	❖ Requires Email integration

NASD/Nasdaq Development Challenge

Project	Challenge
❖ Centralized FOCUS	❖ Requires graphics integration
❖ Advertising	❖ Requires text integration
	❖ Requires reporting tool integration

Technical Architecture

Workstation Platform

Server Platform

Network

Pentium
32 Meg RAM
1 Gig Disk Space
<u>**Windows 3.11 - End User**</u>
Composer 3 Client Manager
Composer 3 Build Tool

<u>**Windows NT 3.51 - Developer**</u>
TCP/IP
Oracle
Composer 3 Toolset
Composer 3 Client Manager
Composer 3 Build Tool

TCP/IP

Data

Composer 3 IEF
Implementation Toolset
TI/IEF Proxy Listener
Sequent Dynix/ptx v4
Oracle v7.2 RDBMS
Tuxedo System (OLTP) 4.2.2
Composer 3 Multiple
Encyclopedia

3rd Party Products Being Used

❖ Text Processors such as MS Word

❖ GrAF

❖ Translation Service & Tuxedo

❖ Visual Basic

❖ Impromptu

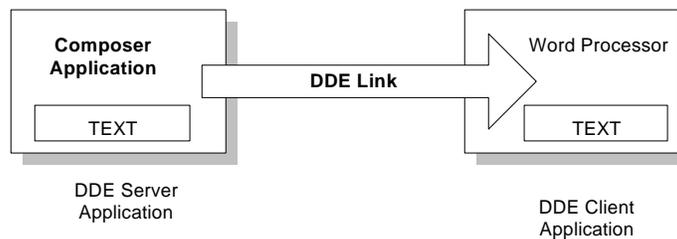❖ Isocor

Text Integration

Requirements

- ❖ Free-form text document preparation
- ❖ Data comes from multiple sources
- ❖ Document length of up to 15 pages
- ❖ Simple word processing capabilities
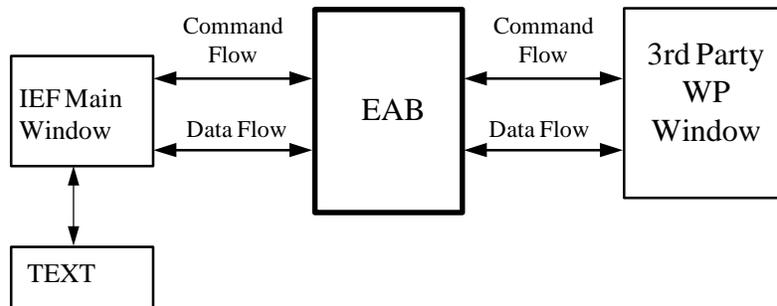- ❖ Ability to package text applications for the standard NASD/Nasdaq target client platform

Solution

- ❖ Develop a technique to integrate 3rd party word processors with Composer
- ❖ Use Dynamic Data Exchange (DDE) to communicate with 3rd party word processors
- ❖ Communication is accomplished through an External Action Block (EAB)

Text Integration

Composer Application	DDE Link →	Word Processor
TEXT		TEXT
DDE Server Application		DDE Client Application

IEF Application Text Integration Data Flow

IEF Main Window	Command Flow / Data Flow	EAB	Command Flow / Data Flow	3rd Party WP Window

TEXT

Graphics Integration

Requirements

❖ Must be an easy to use and learn graphical toolset

❖ Communication linking capability with IEF/Composer generated client applications

❖ Ability to produce pie and bar charts from numeric data

❖ Re-sizable graphical windows

❖ Ability to print

❖ Ability to package graphing applications for the standard NASD/Nasdaq target client platform

Solution - GrAF

❖ Develop a technique to integrate 3rd party graphical tools with Composer

❖ GrAF is an easy solution

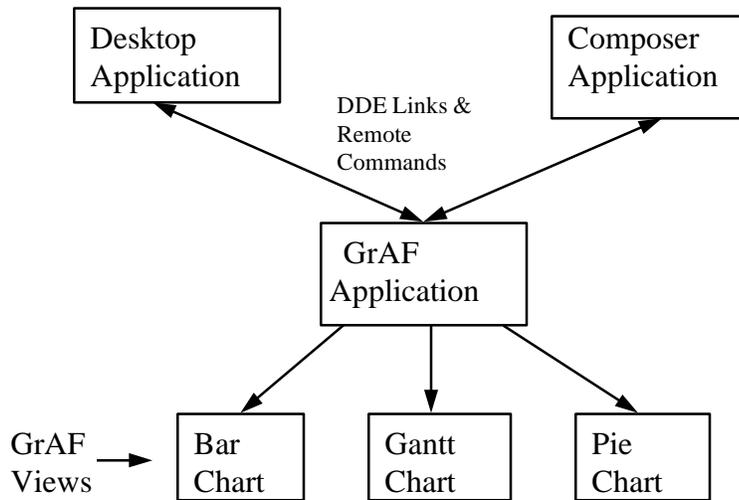❖ Designed to communicate with Composer

❖ Uses DDE

GrAF Defined

❖ GrAF - Graphical application facility is a software tool for developing interactive graphical applications

❖ GrAF can be linked to IEF/Composer generated client applications

❖ GrAF can be a stand-alone application or share data from remote applications

GrAF Use of DDE
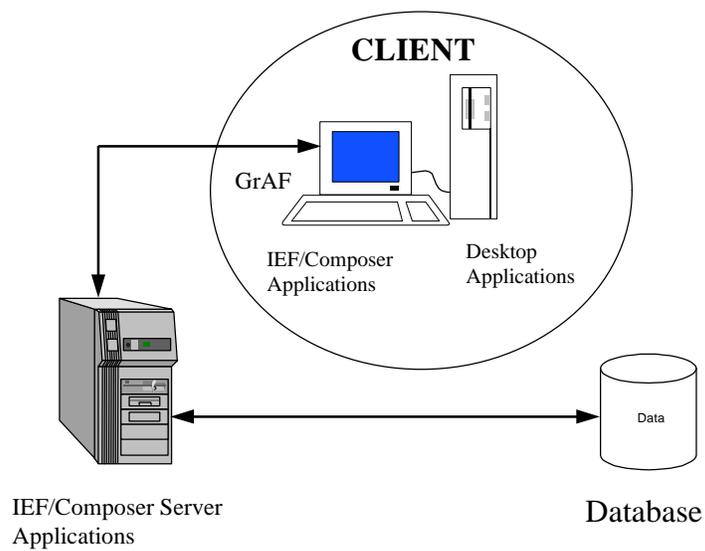
Workstation Internal Communications

IEF/Composer Application		GrAF Application
Export View	Data/Commands Sent to GrAF via DDE Link →	GrAF Record Definition
Import View	← Data/Commands Sent to IEF via DDE Link	

GrAF Architecture

Desktop
Application

Composer
Application

DDE Links &
Remote
Commands

GrAF
Application

GrAF
Views

Bar
Chart

Gantt
Chart

Pie
Chart

GrAF in the IEF/Composer Environment

CLIENT

GrAF

IEF/Composer
Applications

Desktop
Applications

IEF/Composer Server
Applications

Data

Database

Translation Service

Requirements

- Develop the ability to integrate Visual Basic and other development tools for additional GUI capability and programming flexibility
- Must not require any modifications to existing Composer models

Solution - Develop Translation Service

- Layer with Tuxedo
- Keep database independent
- Support standard NASD/Nasdaq message protocol
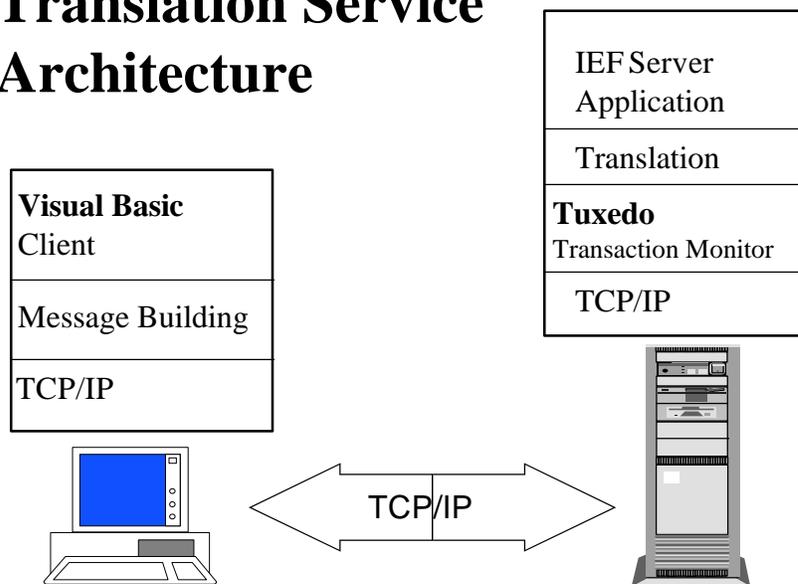
The Translation Service Defined

- Interface between the NASD/Nasdaq standard message protocol and the IEF message protocol
- Routes messages to intended server and routes replies back to client
- Translation table maps procedure steps to actual server applications

Translation Service

| non-IEF Client | | Translation Service | | IEF Server |

NASD message → Translation Service → IEF message → IEF Server

non-IEF Client ← ← IEF Server

Translation Service Architecture

Visual Basic
Client

Message Building

TCP/IP

IEF Server
Application

Translation

Tuxedo
Transaction Monitor

TCP/IP

TCP/IP

Reporting Tool

Requirements

- ❖ Must support client/server
- ❖ Ability to access many types of databases
- ❖ Support database access security
- ❖ Ability to print reports
- ❖ Support interactive reporting
- ❖ Must be an easy use and learn reporting tool
- ❖ Ability to package report applications for the standard NASD/Nasdaq target client platform

Solution - Impromptu

- ❖ Powerful client/server report writer
- ❖ Controls database access & security
- ❖ Catalogs insulates user from database structure
- ❖ Interactive reporting capability
- ❖ Easy to learn and to generate complex reports
- ❖ Runs on standard NASD/Nasdaq target client platform

Impromptu Architecture

Windows
Client

Oracle Server

Oracle SQL*Net

Impromptu
Report
Application

Oracle7
DBMS

Data
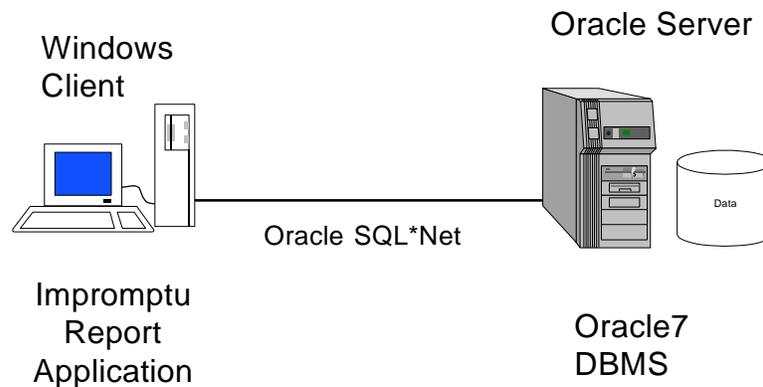
Mail Integration

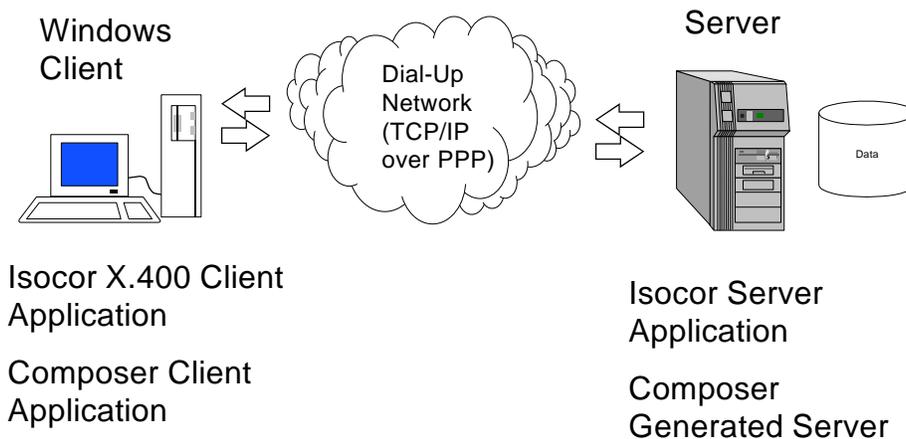### Requirements

❖ Client
  → Sending bulk filings
  → Sending report requests
❖ Server
  → Receiving filings & report requests
  → responding to filings and delivering Reports
  → Receipt acknowledgment & defect notification

Solution - Isocor Mail Tool

❖ Supports standard X.400 communications protocol
❖ MSmail look and feel GUI
❖ Supports APIs which allows for tool customization both on the client and the server
❖ Supports multimedia data handling

Isocor X.400 Mail

Windows Client

Dial-Up Network (TCP/IP over PPP)

Server

Data

Isocor X.400 Client Application

Composer Client Application

Isocor Server Application

Composer Generated Server

Lessons Learned

- Prepare in advance
- Create project management
- Allow sufficient time
- Define metrics for project estimation
- Build prototypes
- Check for hardware/software environment consistency/compatibility
- Obtain expertise in tools being integrated
- Provide training for components of client/server environment
- Develop consistent guidelines
- Establish help desk support

Pros & Cons

PROS

- There are many benefits to integrating with the Composer/IEF Environment
- Expertise can be gained when taking on these challenges
- Receiving technological rewards inspires us to take on even bigger challenges

CONS

- System complexity is increased significantly
- Expertise in latest technology must be obtained
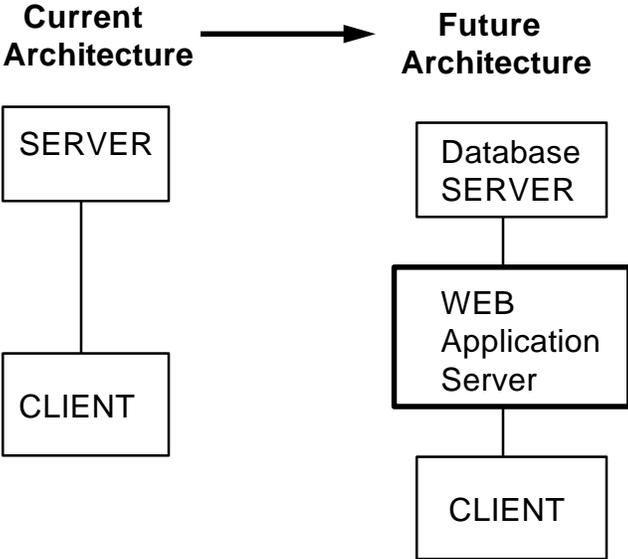- Must train staff in new technology

Summary

❖Technical Architecture

❖Six Types of 3rd Party
 Integration Techniques

❖Lessons Learned

❖Pros & Cons

Challenges Ahead

❖Arranger - use of OLE

❖Inter/Intra Net - Composer WEB
 Server Applications

Internet Application Architecture

Current Architecture → **Future Architecture**

SERVER

|
|

CLIENT

Database SERVER

|
|

WEB Application Server

|
|

CLIENT

WEB Server / "TI INTRAnet Server"

Composer Server Applications

WWW Internet

INTRAnet

Composer Clients

WEB Center/Server

Composer Clients