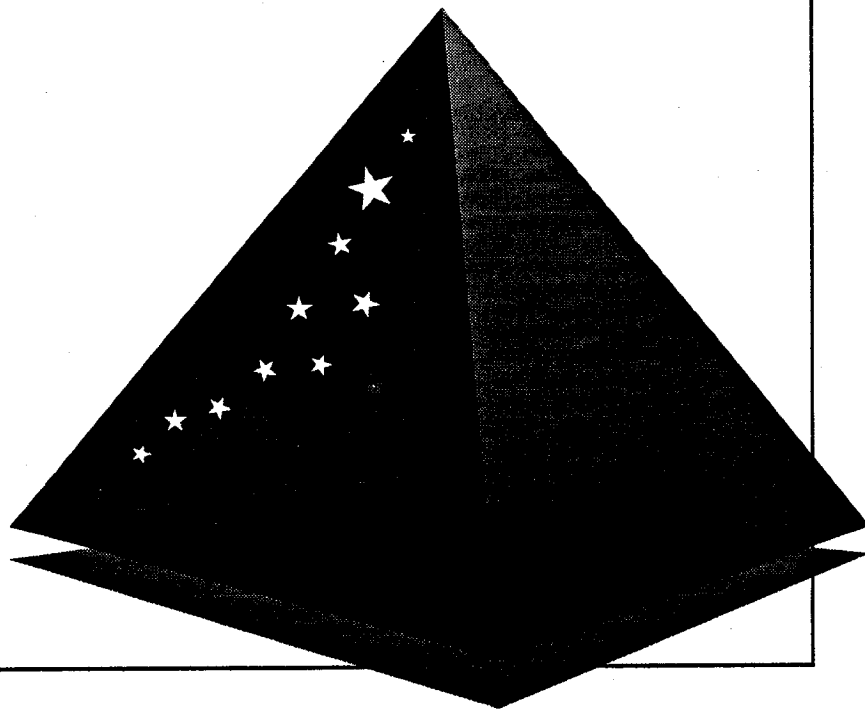
DEVCON '94

CLARION LIGHTS THE WAY TO CLIENT/SERVER

Chris Behling



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Clarion and Client-Server From Concept to Reality

Chris Behling

Vice-President of Technical Services

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Introduction

- Client/Server Terminology
- *Clarion for Windows* implementation of client/server computing
- Optimizing *Clarion for Windows* for client/server
- Design issues of client/server applications

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Terminology

Table	-	File
Column	-	Field
Row	-	Record

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Clarion and Client/Server

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Client-Server Components

- The Client
  - Front-End or User Interface
  - Built with PC Based Tools
- The Server
  - Back-End or SQL Server Engine
  - Organizes and Stores Data
  - Processes Concurrent Requests
  - Controls Data Access and Enforces Security

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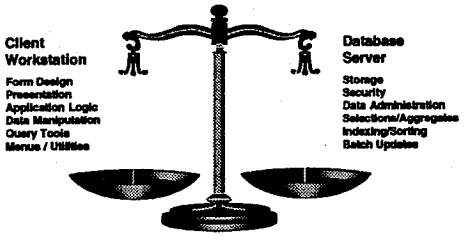
Optimal Division of Labor



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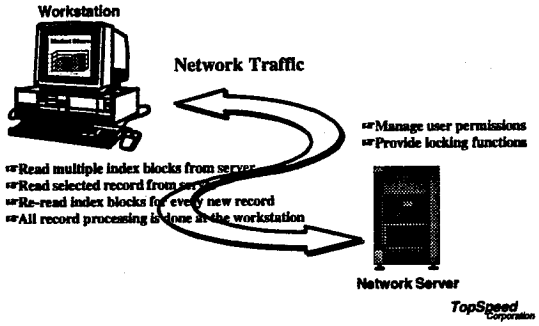
Conventional Network



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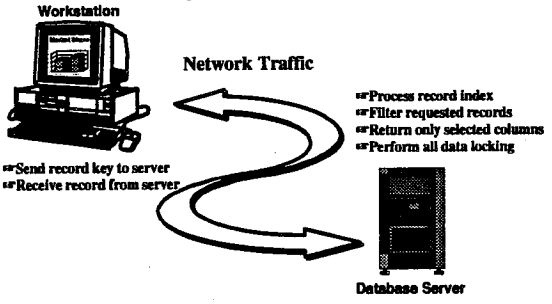
Client/Server Network



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Client-Server Benefits

- Improved Price/Performance
- Increase End-User Productivity
- Scalable Architecture
- Easy Integration of New Technologies
- Better Control and Management of Information
- Distributed, Enterprise-wide Information Access

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Why SQL on the Server?

- SQL is an Industry Standard
  - 1988 endorsed by ANSI and ISO
- SQL is Popular
  - Used in IBM's DB/2 and SQL/DS
  - Supported by Microsoft, Oracle, Sybase, Gupta Technologies, and Others
- SQL is a Powerful Relational Language
  - Effective as a Standard Language to Integrate Multi-Vendor Systems.

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Architectural Overview

- Data Dictionary
- Data Definition and Access Language Syntax
- Database Drivers
- ODBC Driver

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Architecture Goals

- Data Transparency
- Language Abstraction

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Data Dictionary

- Definition of all files and fields
- Information used by application generator
- Can be generated from server based information

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Language Syntax

- Data access syntax is independent of Data Source
- VIEW syntax allows joins between different data sources

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Database Drivers

- Select data source in dictionary
- No other modifications are required

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More Terminology

- Join - Related Tables
- Project - Selected Fields
- Summary - Summarize Field
- Filter - Selection Criteria

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What About ODBC?

- Open Database Connectivity
- Microsoft database access standard
- Cross-Platform API (Windows & Mac)
- Widespread back-end driver support by database vendors

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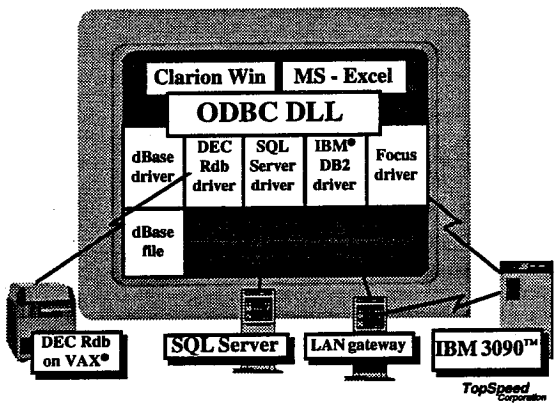

CW ODBC Driver

- Seamless access with a single API
- Back-end driver supplied by database vendor
- Network library required
- Varied levels of functionality

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Optimizing Performance

- Avoid operations that cause substantial changes in record pointer, such as going to the last record
- All records in between the current and last record must be processed

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Optimizing Performance (continued...)

- Avoid retrieving records in reverse when a reverse-key index does not exist.
- Pressing 'PageUp' in a browse procedure will cause this to happen
- Selecting the 'PREVIOUS' record in a form will cause this to happen

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Optimizing Performance (continued...)

- Use clustered indexing on the server for your primary unique key.
- This will cause the data records to be stored in that key order, reducing sort, update, and search times

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Optimizing Performance (continued...)

- If you retrieve a small number of columns, include all the columns you need to retrieve in the index after the key and the data records will never need be accessed (Sybase and MS-SQL Server)

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Optimizing Performance (continued...)

- When to use pass-through SQL instead of Clarion syntax
- Determine what SQL Clarion driver is generating and use the following scenarios to best tune performance
- Determine whether Clarion program needs record

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Clarion SQL Example (Bad)

```
SET(CUS:AcctKey)
LOOP UNTIL EOF(Customers)
  IF CUS:TotalDue > 10,000 THEN
    CUS:LastAction = '09/07/94'
    UPDATE(Customers)
  END
  NEXT(Customers)
END
```

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Optimized SQL Example (Bad)

```
select * from     Customers

update            Customers
set               LastAction = '09/01/94'
where             CustId = '001'

update            Customers
set               LastAction = '09/01/94'
where             CustId = '002'
```

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Why This Is Bad

- Separate transaction for each update
- Two database connections must be active
- Index must be searched for each update
- Heavy network traffic
- Poor performance

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Optimized SQL Example (Best)

```
update            Customers
set               LastAction = '09/01/94'
where             TotalDue > 10,000
```

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Why This Is Good

- Entire update is under control of one transaction
- No searching of index for CustId to update individual records
- Much more efficient locking on server
- Only one database connection needed
- Minimal network traffic

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Clarion Views

- Clarion VIEW statement
  - Join multiple tables
  - Join different data sources
  - Add record selection criteria
  - Select specific fields

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Clarion Views

```
VIEW(Part)
        FILTER('PRT:OnHand = 0')
        PROJECT(PRT:Number,PRT:Name,PRT:OnHand)
        JOIN( Vendor, PRT:Vendor, VND:Number)
              PROJECT(VND:Name,VND:Address)
        END
END
```

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SQL Views

- SQL view statement
  - Create a 'table' definition from multiple related tables
  - Summary fields can be included
  - Import definition into dictionary
  - Only one table in the view can be updated
  - Define frequently used views on the server

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Server Locking

- Page locking
- Lock escalation
- Optimistic concurrency — don't lock
- Browse mode

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SQL Error Handling

- SQL errors passed through to application
- Invalid actions cannot be executed
- Transaction control maintains data-integrity

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Availability

- ODBC Driver - Now
- AS/400 - Final Release
- SQL Server - Version 1.1
- Oracle - Version 1.1
- Gupta - Version 1.1

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Where to get more information

- Clarion for Windows training
- Clarion Developer Newsletter
- AS/400 white paper
- Consulting Services

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