Local vs. Client/Server Databases
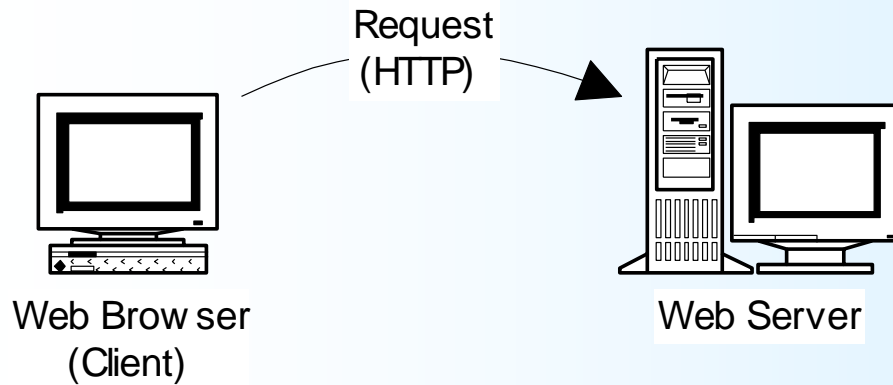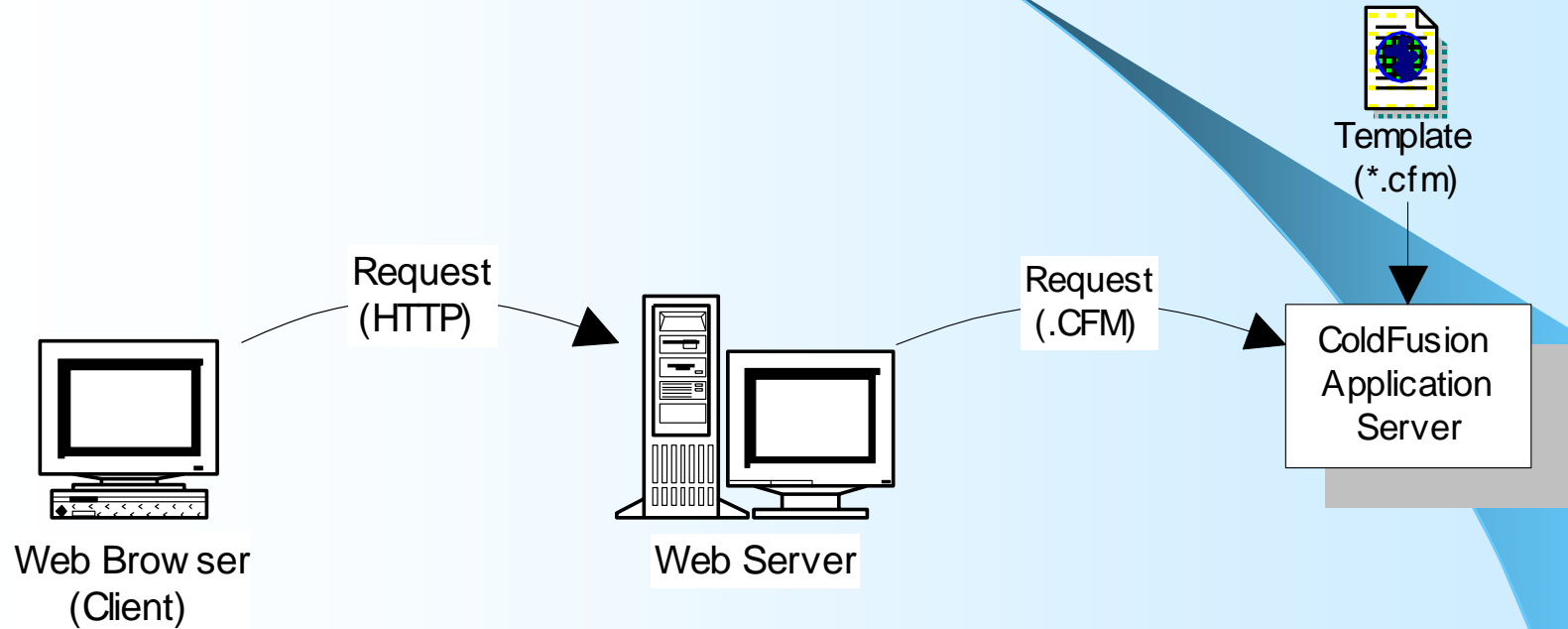
Ted Blue
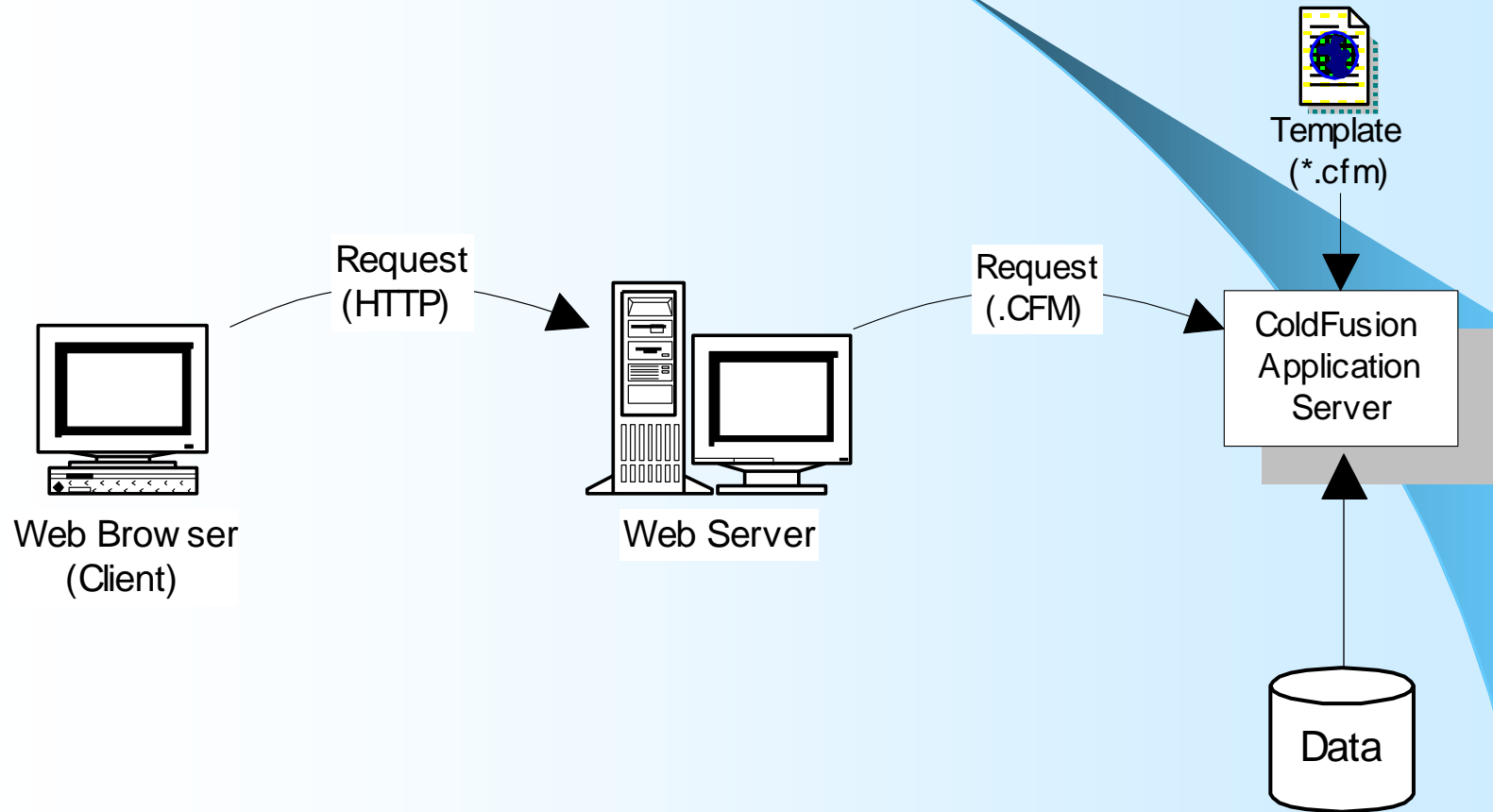
Web Apps are Client/Server

Web Browser
(Client)

Request
(HTTP)

Web Server

Web Apps are Client/Server

Template
(*.cfm)

Request
(HTTP)

Request
(.CFM)

ColdFusion
Application
Server

Web Browser
(Client)

Web Server

Web Apps are Client/Server

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Data

Web Apps are Client/Server

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(HTTP)

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ColdFusion
Application
Server

Web Browser
(Client)

Web Server

Response
(HTML)
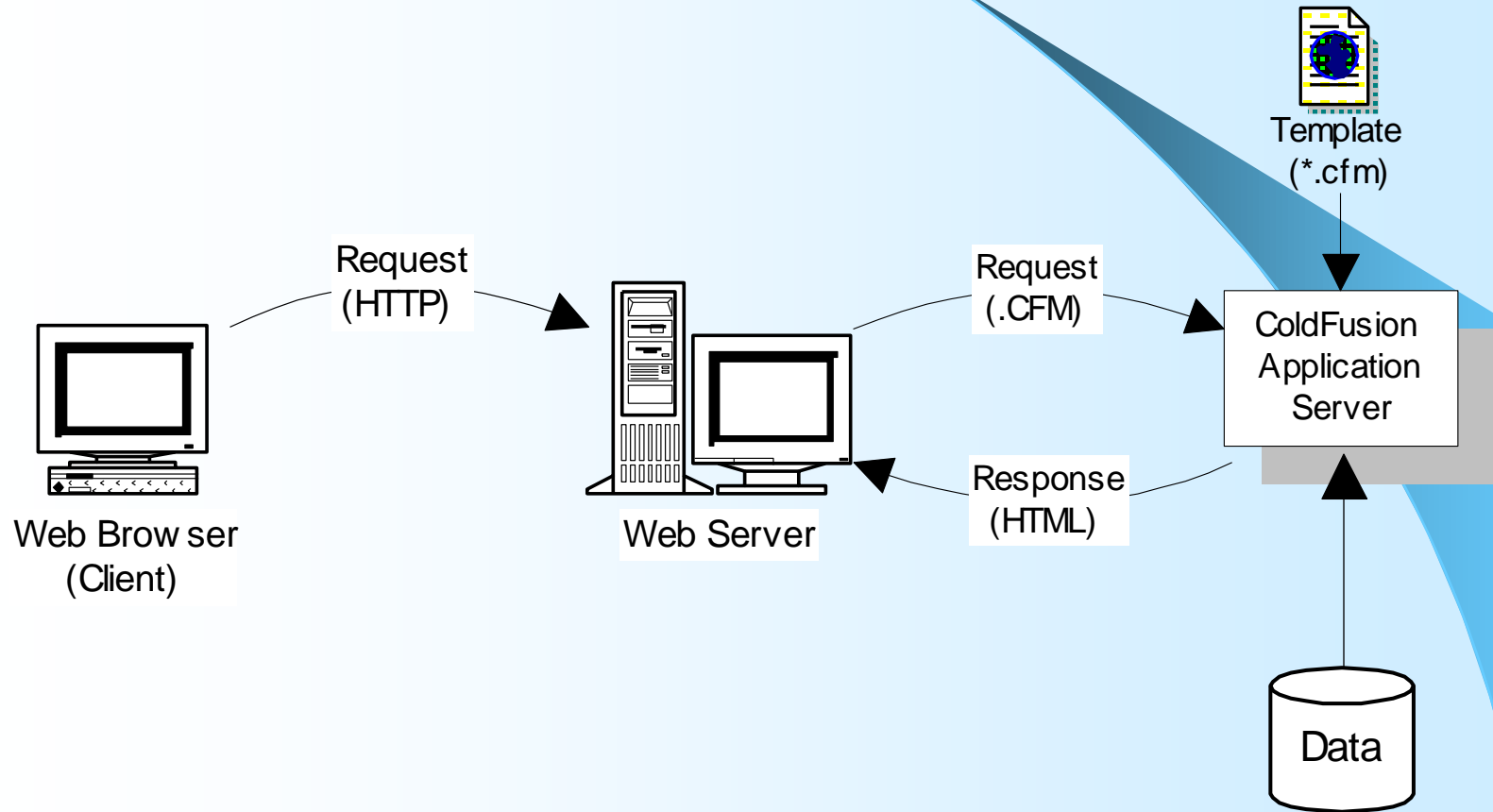
Data

Web Apps are Client/Server
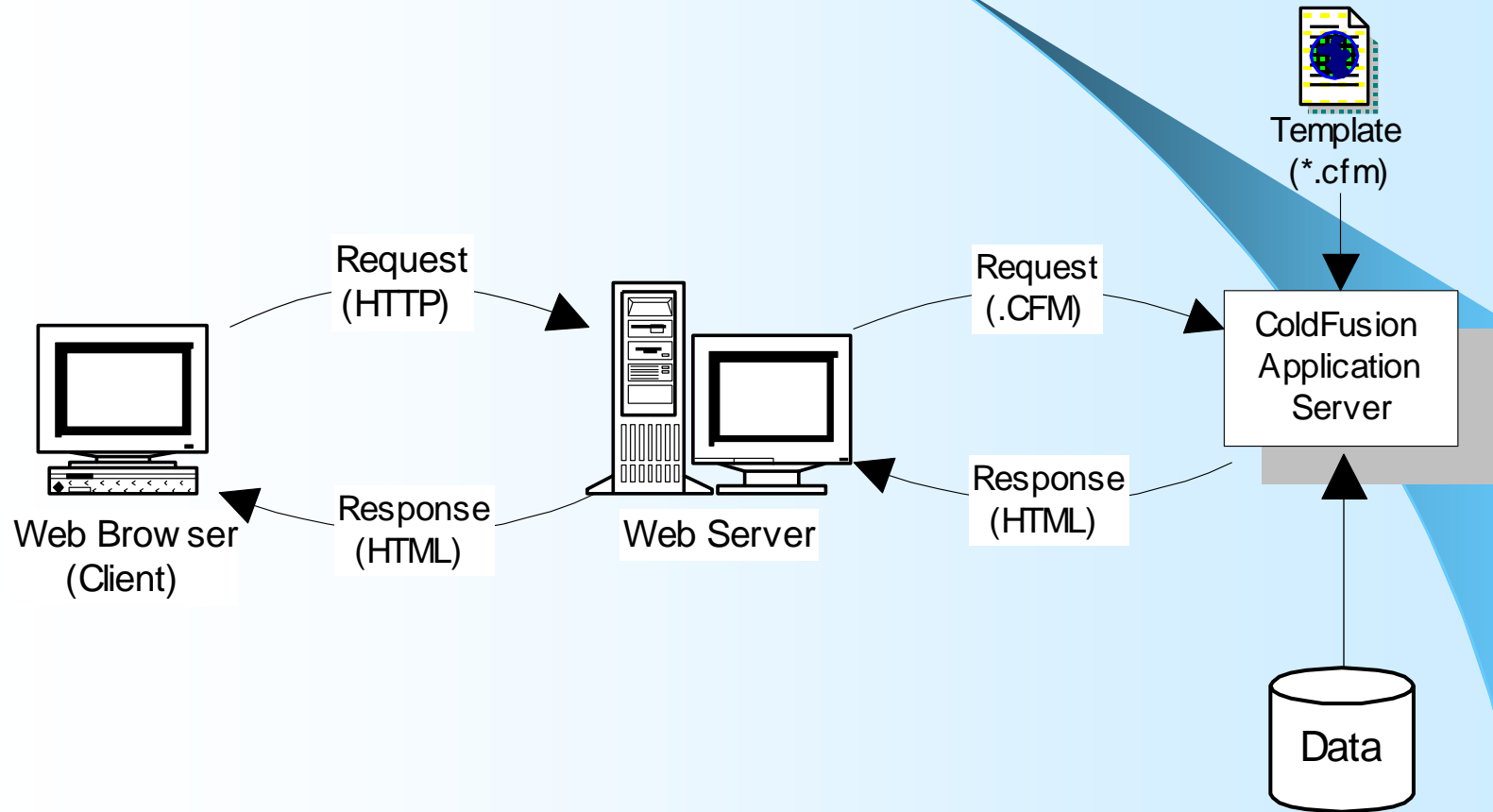
Local Databases

- dBASE, FoxPro, Paradox, Microsoft Access

Local Databases

- dBASE, FoxPro, Paradox, Microsoft Access
- No Database Management System

Local Databases

- dBASE, FoxPro, Paradox, Microsoft Access
- No Database Management System
- Minimal Setup and Configuration

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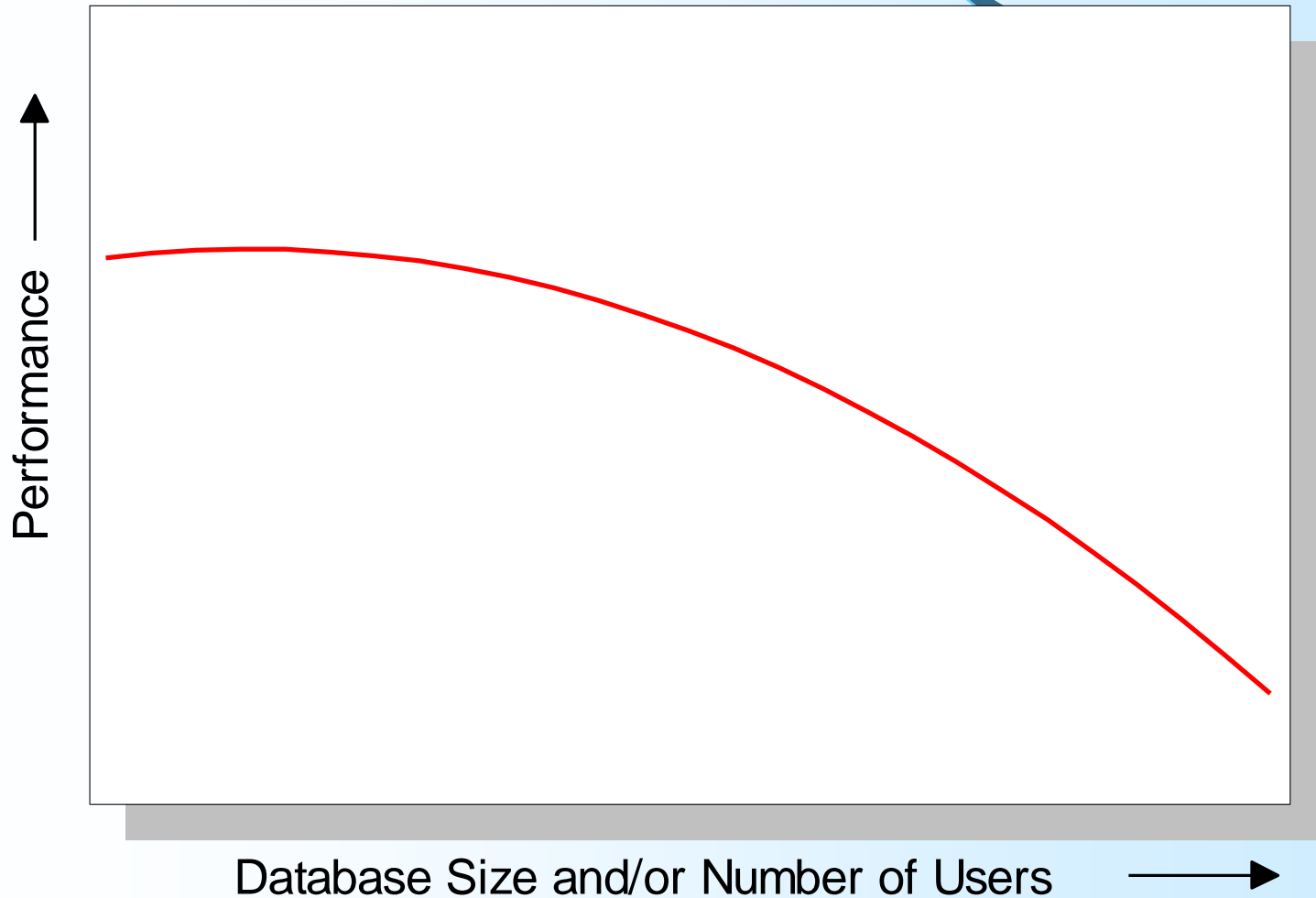- Low Cost

Performance of Local Databases

- Unable to perform under load

Performance of Local Databases

- Unable to perform under load
- Unable to handle large datasets

Performance of Local Databases

Performance

Database Size and/or Number of Users

Performance of Local Databases

- Load limits:
  - About 10-20 users maximum

Performance of Local Databases

- Load limits:
  - About 10-20 users maximum
- Dataset size limits:
  - About 100-500k records maximum and/or
  - About 1-5MB total size

Performance of Local Databases

- Load limits:
  - About 10-20 users maximum
- Dataset size limits:
  - About 100-500k records maximum and/or
  - About 1-5MB total size
- Cannot be improved with hardware

Data Integrity and Local Databases

- Easily corrupted

Data Integrity and Local Databases

- Easily corrupted
  - Corruption amplified under load
  - Memo fields sensitive to corruption

Data Integrity and Local Databases

- Easily corrupted
- Pessimistic record locking

Data Integrity and Local Databases

- Easily corrupted

- Pessimistic record locking
  - Relies on active connection to data
  - Not possible in client/server web applications

Data Integrity and Local Databases

- Easily corrupted
- Pessimistic record locking
- Unmanaged indexes

Data Integrity and Local Databases

- Easily corrupted

- Pessimistic record locking

- Unmanaged indexes
  - Indexes corrupt during modifications
  - …Corrupt indexes cause invalid data retrieval
  - …Invalid data retrieval damages data integrity

Data Integrity and Local Databases

- Easily corrupted
- Pessimistic record locking
- Unmanaged indexes
- Concurrency

Data Integrity and Local Databases

- Easily corrupted

- Pessimistic record locking

- Unmanaged indexes

- Concurrency
  - Multiple users can update same data
  - Concurrency problems do not generate errors

Data Integrity and Local Databases

- Easily corrupted
- Pessimistic record locking
- Unmanaged indexes
- Concurrency
- Transaction control

Data Integrity and Local Databases

- Easily corrupted
- Pessimistic record locking
- Unmanaged indexes
- Concurrency
- Transaction control
  - No simultaneous commit
  - No rollback capability

Client/Server Databases

- Oracle, Sybase, SQL Server, Informix, etc.

Client/Server Databases

- Oracle, Sybase, SQL Server, Informix, etc.
- Database Management Systems (DBMS)

Client/Server Databases

- Oracle, Sybase, SQL Server, Informix, etc.
- Database Management Systems (DBMS)
- More elaborate Setup and Configuration

Client/Server Databases

- Oracle, Sybase, SQL Server, Informix, etc.
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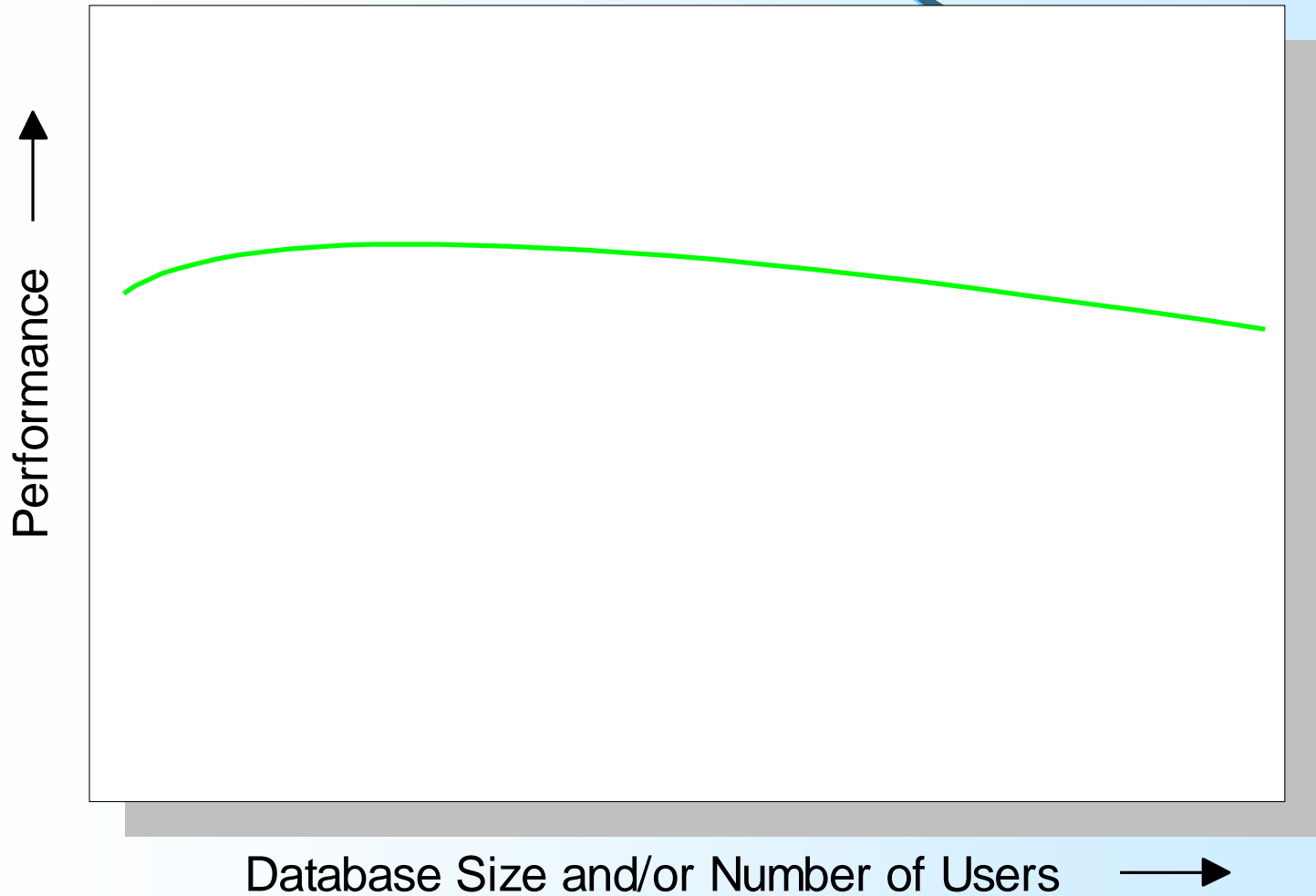- More elaborate Setup and Configuration
- Higher Cost

Performance in Client/Server Databases
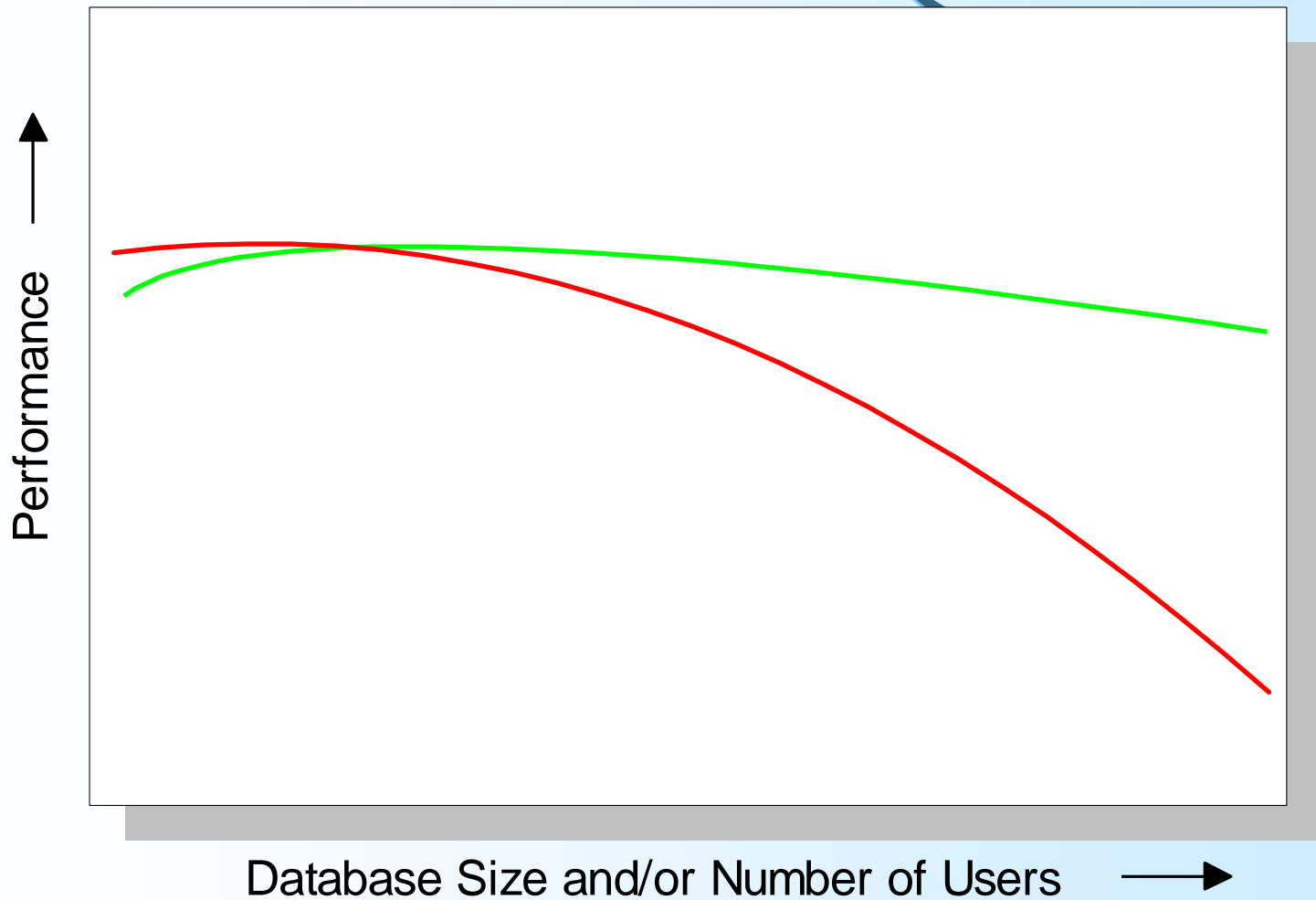
- Excellent performance under load

Performance in Client/Server Databases

- Excellent performance under load

- Designed to handle large datasets

Performance in Client/Server Databases

Performance in Client/Server vs. Local Databases

Performance in Client/Server Databases

- Load limits:
  - Hundreds or Thousands of Users

Performance in Client/Server Databases

- Load limits:
  - Hundreds or Thousands of Users
- Database size limits:
  - Millions of records
  - Size limited only by available storage

Performance in Client/Server Databases

- Load limits:
  - Hundreds or Thousands of Users
- Database size limits:
  - Millions of records
  - Size limited only by available storage
- Scaleable with hardware

Data Integrity in Client/Server Databases

- Corruption Management

Data Integrity in Client/Server Databases

- Corruption Management
  - Detects and corrects corruption dynamically
  - Prevents corruption automatically

Data Integrity in Client/Server Databases

- Corruption Management

- Optimistic Record Locking
  - Locks occur during updates
  - Manages record lock conflicts
  - Perfectly suited to web applications

Data Integrity in Client/Server Databases

- Corruption Management

- Optimistic Record Locking

- Managed Indexes
  - Indexes created as needed
  - Automatic corruption detection and correction
  - Accurate data retrieval

Data Integrity in Client/Server Databases

- Corruption Management
- Optimistic Record Locking
- Managed Indexes
- Concurrency Control

Data Integrity in Client/Server Databases

- Corruption Management

- Optimistic Record Locking

- Managed Indexes

- Concurrency Control
  - Queues updates from multiple users
  - Concurrency problems generate errors
  - Invalid data not allowed into database

Data Integrity in Client/Server Databases

- Corruption Management
- Optimistic Record Locking
- Managed Indexes
- Concurrency Control
- Transaction Control

Data Integrity in Client/Server Databases

- Corruption Management
- Optimistic Record Locking
- Managed Indexes
- Concurrency Control
- Transaction Control
  - Transaction Log tracks all changes by all users
  - Commits multiple changes simultaneously
  - Rollback for incomplete or inaccurate updates

Additional Client/Server Database Features

- Disaster Recovery

Additional Client/Server Database Features

- Disaster Recovery
- Security

Additional Client/Server Database Features

- Disaster Recovery
- Security
- Views

Additional Client/Server Database Features

- Disaster Recovery

- Security

- Views

- Stored Procedures

Additional Client/Server Database Features

- Disaster Recovery
- Security
- Views
- Stored Procedures
- Triggers

Additional Client/Server Database Features

- Disaster Recovery
- Security
- Views
- Stored Procedures
- Triggers
- Replication

Additional Client/Server Database Features

- Disaster Recovery
- Security
- Views
- Stored Procedures
- Triggers
- Replication
- Advanced SQL Processing

Cost and Implementation

Local Databases

- Low Cost

Client/Server Databases

- Higher Cost

Cost and Implementation

Local Databases

- Low Cost

- No Licensing Fees

Client/Server Databases

- Higher Cost

- Licensed Per User

Cost and Implementation

Local Databases

- Low Cost
- No Licensing Fees
- Minimal Setup and Configuration

Client/Server Databases

- Higher Cost
- Licensed Per User
- Configuration can be complex

Cost and Implementation

Local Databases

- Low Cost
- No Licensing Fees
- Minimal Setup and Configuration
- Minimal maintenance

Client/Server Databases

- Higher Cost
- Licensed Per User
- Configuration can be complex
- May require DBA

Making a Choice

Local Databases

- Small databases

Client/Server Databases

- Medium/Large Databases

Making a Choice

Local Databases

- Small databases
- Minimal Traffic

Client/Server Databases

- Medium/Large Databases
- Moderate or High Traffic

Making a Choice

Local Databases

- Small databases
- Minimal Traffic
- Read-only Data

Client/Server Databases

- Medium/Large Databases
- Moderate or High Traffic
- Updateable Data

Making a Choice

Local Databases

- Small databases
- Minimal Traffic
- Read-only Data
- No Transactions

Client/Server Databases

- Medium/Large Databases
- Moderate or High Traffic
- Updateable Data
- Transaction-based Sites

Choose Wisely…