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# Three-Tiered Client-Server Systems Gain As Enterprise Wide Solution

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Dad karma traditionally flows in threes, as in three strikes, three on a match or three's a crowd.

A notable exception, however, is in the area of client-server computing, where a second-generation, "three-tiered" approach to constructing systems is generating excellent vibes.

The essence of any client-server system is the breakup of an application into discrete units, allowing some parts of the application to be changed while others are shielded.

## Computers & Automation

A standard "two-tiered" architecture separates the client PC or workstation from a back-end database server. The two servers routinely pass data back and forth. But both elements typically must run on a single vendor's hardware, which ultimately locks the user into the same proprietary trap that he or she was looking to escape in the first place.

Most of the early departmental-level client-server projects were built on a two-tiered foundation and fell way short of delivering on their promise.

"The traditional approach has been useful for small groups of users in decision-support applications," noted Kent Lawson, the president of Magna Software Corp., a supplier of client-server application development tools.

"However, users need a way to scale up these applications to the entire enterprise," he said. "And two-tier is too monolithic and inflexible for these mission-critical applica-

tions. The applications look great in prototype, but they hit the wall when they get into production. We can't stretch two-tier technology any further."

Among other shortcomings, two-tier systems can't be scaled up to provide access to multiple databases. They are subject to bottlenecks due to unlimited data flow between the information source and the client, and they can't provide the security of controlling what functions are performed on the data.

The new "three-tiered" model, by contrast, separates the application functions into a "presentation" layer, which is the client's PC or workstation; a "data" layer, which is the database or legacy system; and a "functionality" layer, which bridges the other two tiers.

### DCE Standards

Under this model, users deal only with their own presentation layer. Client requests are funneled through the functionality layer, where the heavy computing occurs. The functionality servers, which can comprise many platforms and languages, handle a range of duties, including connecting to existing systems or new databases; processing and formulating data; running applications across networks; and handling systems management functions.

According to consultant John Donovan, who strongly advocates a shift to three-tiered client-server computing in his recent book, "Business Reengineering With Information Technology" (Prentice-Hall), the approach also is characterized by adherence to the Open Software Foundation's Distributed Computing Environment (DCE) standards.

Those standards define how servers and clients communicate and have been implemented by every major vendor. "Any proprietary or open standard can operate within

### Key Advantages of Three-Tier

- Scalability - The ability to move from a departmental to an enterprise-wide system.
- Security - The ability to control not only user access to data, but functions that users can perform.
- Reduced network traffic limiting the amount of data flow between client and data source.
- Ability to include old mainframes and PCs in the overall schema.
- Better "manageability," by reducing the amount of applications services kept on the client.

this environment," said Donovan. "Because the user interface clients only communicate with the data through an intermediate server, as long as the appropriate server's in place, any application may gain access to any type of data, on any system, at any location. That's what I'd call flexibility."

Donovan adds that by enabling users to access information off their old mainframes within a distributed processing environment, three-tier architectures help preserve billions of dollars in existing investment.

Roy Schulte, vice president of software management services at the Gartner Group, a Stamford, Conn.-based research firm, goes Donovan one better, noting even DCE standards aren't absolutely necessary to implement three-tier

solutions.

"Transaction processing monitors," like Transarc Corp.'s Encina and Novell Inc.'s Tuxedo, can handle all the essential systems management and distribution functions without DCE compliance, says Schulte.

Transarc and Novell last week joined several other hardware and software vendors at a press conference at Unix Expo in New York to herald the dawn of three-tier networking.

Representatives of Digital Equipment Corp., Hewlett-Packard Co., Tandem Computers Inc. and Magna Software reiterated their commitments to delivering a complete set of tools to build and maintain three-tier installations.

#### Massive Support

They also cited numerous customer examples of three-tier enterprises, including Tokio Marine & Fire Insurance Co. of Japan and the Union Bank of Finland, where an expanding network processes 3 million transactions a day and employs a 350-gigabyte database.

"Only a three-tier architecture could support that massive application and massive database," noted Tim Keefauver, corporate marketing manager at Tandem, Union Bank's hardware supplier.

However, not every vendor is enthralled by the three-tier concept. Major database suppliers like Oracle Corp. and Sybase Inc. were notably absent from the Unix Expo press conference.

"A major advantage of three-tier is a large degree of database independence, the ability to access data on any source," explained Gartner Group's Schulte. "The big database vendors have promoted two-tier (solutions) where the application logic is tightly bound into the database management system and isn't portable between the databases. They still try to lock you in."