

TimeLink **Enterprise 6**

Technical White Paper

January 2005



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Technical Overview:

TimeLink Enterprise 6 is a comprehensive Enterprise Workforce Management solution. It has been developed in accordance with the Java 2 Enterprise Edition (J2EE) specification delivering unsurpassed flexibility and portability on a proven platform. TimeLink 6 is operating system, application server and database independent. This flexibility allows an organization to leverage their existing technical resources and infrastructure, thereby lowering their total cost of ownership.

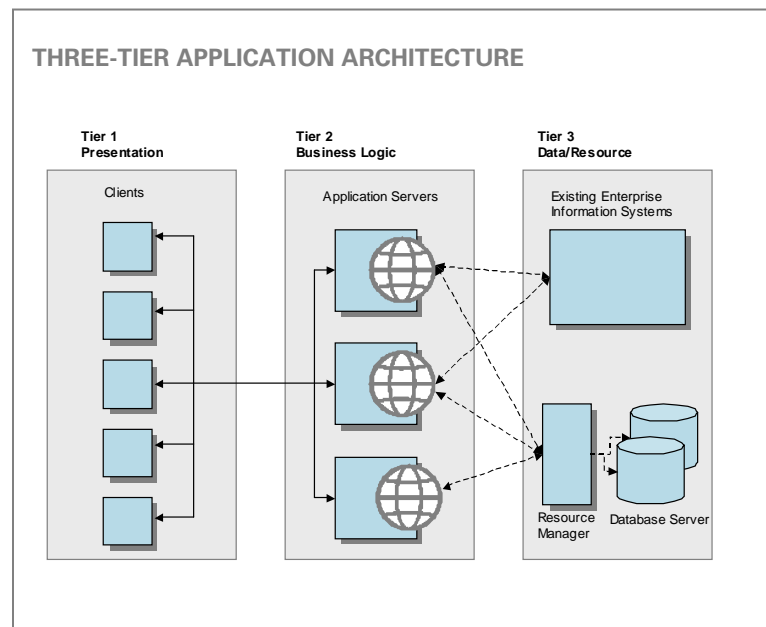


Architecture:

TimeLink Enterprise 6 supports a standard three-tier application architecture. This architectural model supports highly distributed application deployments across multiple independent servers, typically:

- Presentation – components accessed on a local workstation via a web browser (tier one)
- Business Logic – processes running on remote servers (tier two)
- Data/Resource – a collection of database and/or external systems (tier three)

Note: These are logical tiers. They may or may not be deployed on the same physical server.



First Tier: This tier is responsible for the presentation and user interaction. These client components provide for secure and standard communication with the business application logic tier.

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TimeLink Enterprise 6
Enterprise Workforce Management

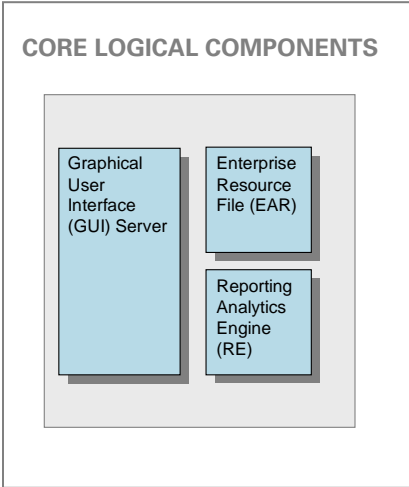
TimeLink Enterprise 6 supports a rich, web-based presentation tier (client).

Second Tier: This tier contains all of the business logic of the application. These business logic components can access the third tier. This tier contains the majority of the application processing. It can be accessed by multiple client components simultaneously.

Third Tier: This tier typically is where data resources reside. The second tier is permitted to access this tier to interact with persisted data resources or external systems.

Packaging:

TimeLink is comprised of several key logical components. These packages are independent and can be deployed in a variety of configurations in support of customer requirements. TimeLink’s core logical components include:



TimeLink Graphical User Interface Server (GUI)

TimeLink implements a next generation user interface server. This technology allows TimeLink to provide users with a rich and intuitive user interface accessible via a standard web-browser with 'no code on the client'. There are no applets, active-x controls, plug-ins or other code to download and run on the client, thereby minimizing exposure to potential IT security threats and increasing application availability.

TimeLink's GUI server allows us to deliver a familiar windows look and feel to our users, including intuitive drop-down menus and iconic toolbars, minimizing training requirements and providing greater user satisfaction.

In addition, our user interface server has also been designed to more efficiently communicate across the network. The user interface will only exchange 'net-data', data that has changed, thereby minimizing data transferred during a network round trip.

Note: There is no code (applets, active-x controls, plug-ins, etc.) to download to the client.

TimeLink Enterprise Application Resource (EAR)

TimeLink's EAR contains the core application business logic. It can be deployed on a single physical server or across multiple servers for enhanced performance and scalability and failover.

TimeLink Reporting Engine (RE)

TimeLink implements the industry leading report and analytics engine from Business Objects – Crystal Reports.



TimeLink Database Schema (SQL)

TimeLink utilizes a single common and integrated database schema for persisting application data. TimeLink provides a single SQL script that can be run to create the requisite database schema.

Infrastructure Requirements:

TimeLink has been built in accordance with the J2EE specification and therefore requires a J2EE compliant infrastructure to support its deployment. The following chart outlines currently supported infrastructure components recommended for TimeLink Enterprise 6.

<p>Application/Web (HTTP) Server</p> <p>IBM Websphere JBoss/Tomcat</p>	<p>Operating System</p> <p>Microsoft Windows 2000+ Red Hat Enterprise Linux (AS/ES)</p>
<p>Database</p> <p>Oracle 9i, 10. Microsoft SQL Server 2000, 2005</p>	<p>Browser Support</p> <p>Microsoft IE 5.5+</p>



Deployment:

TimeLink Enterprise 6 has been architected to support a variety of deployment options – from smaller single server environments up to multi-server high availability enterprise deployments. The specific deployment that will most efficiently meet your requirements is a factor of a variety of attributes, including but not limited to:

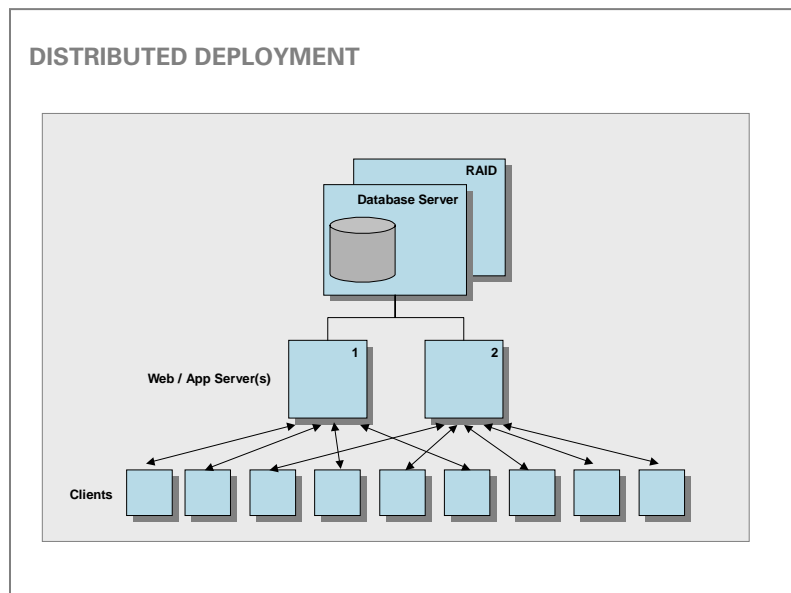
- Concurrent Users
- Employee Population
- Network Bandwidth/Infrastructure
- Availability/Performance Requirements
- Underlying Business Processes
- Business Rules

Single-Server Deployment

In a single server deployment all of the TimeLink packages can be deployed on a single physical server. While this is possible, it obviously has significant implications in regard to system performance and is not recommended for large multi-server environments.

Distributed Deployment

In support of high-availability, high-throughput enterprise deployments, a more distributed approach is recommended. A distributed deployment is one in which the logical components of the application are deployed on different physical servers in order to provide enhanced uptime and performance. This distributed approach is also highly scalable. This inherent scalability insures support for future application growth.



Application Metrics:

Memory

Each session that is initiated on an application server will require a segment of server memory. Therefore the number of concurrent users on a server will increase the memory requirements of the server. A typical user session can consume between 5MB – 10MB of server memory depending on the significance of the transaction that is being executed in the session.



Network Bandwidth

TimeLink's user interface has been optimized to minimize the resource constraint on your network. Unlike less efficient technologies (such as JSP, ASP, JSF, etc.) that require entire pages (data and interface components) to be constantly reloaded from the server, the TimeLink interface only loads 'net-data' or the data that has changed. Typical user transactions consume approximately 60-120k of bandwidth.

Database Sizing

Based upon typical application usage, it is estimated that a full year of transactions for a single employee would require approximately 2MB-5MB of disk space within the TimeLink Enterprise 6 database.

Note: Measurements were taken in a controlled environment replicating estimated typical application usage.



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