

# clockware™

## Capacity Planning Guide

*Time & Work Tracking Systems*



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# Clockware Capacity Planning Guide

This document describes the hardware required to run Clockware's web-based time tracking software application. This document makes the following recommendations:

- Use one application/web server and one database server for every 100 concurrent users
- Use load balancing to support a web farm for more than 1,000 concurrent users
- Use dual processors of at least 1.7 GHz and 2 GB RAM for an application/web server
- Use dual or quad processors of at least 1.7 GHz and 2 GB RAM for a database server
- Use a 100 Mbps line to the database server

## Concurrent Users

The number of concurrent users is the major factor that determines the number of application/web servers you require. You must plan for the maximum concurrent usage, and you should install a separate application/web server for every additional 100 peak concurrent users. Time and work tracking data are quite different from sending an ordinary accounting or other transaction. A single web-based transaction for time and work tracking might include header information and 10 or more work item entries, as well as related customer, location and other key data. When this data is entered for the first time, in accounting terms, these would be like 10 or more separate transactions. Thereafter, unless changes are made to these data entries, they are merely refreshed through the user interface.

Typically, there are two daily peak periods for the saving and submission of timesheet data, in the late morning and in the late afternoon. Further, additional weekly peak periods occur at the end of the work week, often Friday's for most companies, and additional monthly peak periods occur at the very end of the month, or very beginning of the next month if users are allowed to save and submit data using that timeframe. It is the number of timesheets saved and submitted during these peak periods that determines your system and network requirements.

The *peak constant* in the following formula reflects our experience with customers who have a larger number of Clockware time and work tracking systems users. It reliably estimates the peak time and work tracking system load in high-usage systems. The annual business hours is the industry standard that takes typical vacations into account. Use the following worksheet to estimate your peak hourly concurrent transactions.

Concurrent user worksheet	
Total number of users	1,000
Number of weeks in year	52
Timesheets per year	52,000
Divide line 1 by 2,000 annual business hours	26
Multiply line 2 by a 380% peak constant	3.8
Peak concurrent users	99

The example in this worksheet estimates approximately 100 users simultaneously saving and submitting timesheets during the peak hour.

## Hardware Requirements

Track is not a "heavy" application due to its clean UI and use of Java, and is designed to use minimal system resources. It runs well on any standard office workstations that are configured to support common applications, such as Microsoft Office.

Clockware was written for J2EE and the web from the ground up and inherently supports an n-tier architecture. For instance, when using WebLogic as an application server, the application can scale to tens of thousands of concurrent users through clustering to create a server farm. This architecture provides Clockware with unparalleled scalability and fail-over.

In general, for implementations with less than 250 users, a single-tier system will be more than adequate. Between 500 and 1,000 users, you will achieve higher performance with a two-tier system. Typically, for these implementations the 1<sup>st</sup> tier be an application/web server and the 2<sup>nd</sup> tier a database server. For greater than 1,000 users, consult with your application specialist and Clockware technical services for guidance.

*Application Server*

Clockware’s application server is key to its scalable architecture. The application server manages and creates a connection pool with the database. As such, the number of connections it will make is determined within application server settings. In general, the application server initializes a minimum of 8 connections per JRE (Java Run-time Engine). This setting also sets the maximum number of connections. There is currently no defined maximum number of concurrent users.

**Application Server Requirements**

<b>Operating Systems</b>	
Microsoft	Windows NT Server 4.0 with Service Pack 6 Windows 2000
Sun	Solaris 7, 8
Linux	Red Hat Linux 7.2
<b>System Requirements</b>	
Memory	1 to 2 GB RAM (recommended)
Disk Space	200 MB: NT 400 MB: Windows 2000 400 MB: Solaris 200MB: Linux 18 GB HD (minimum)
Processor	1 GHz dual processor (minimum)
Email	SMTP messaging (optional)

*Database Server and Database Sizing*

Clockware supports MS SQL Server, Oracle and MYSQL. Although support for nearly any SQL database is possible, Clockware recommends only client/server databases due to the multi-user nature of its applications. **Database sizing** requirements are approximately 150KB per user per year. Clockware recommends dual to quad processors for the database server.

The following specifications are for a system with 100 peak concurrent users.

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## Database Server

<b>DBMS (Database Management System)</b>	<b>Operating Systems</b>
Microsoft SQL Server 2000 Oracle 8i, 9i MYSQL 3.23.54	Windows NT Server 4.0 with Service Pack 6 Windows 2000 Solaris Operating Environment 7, 8 Red Hat Linux 7.2
<b>System Requirements</b>	
Memory	2 to 4 GB RAM (recommended)
Processor	2 to 4 CPUs, 1 GHz (minimum)
Disk Space	200 MB: NT 400 MB: Windows 2000 400 MB: Solaris 200 MB: Red Hat 18 GB HD (minimum) Sufficient disk space for your needs

Clockware's time and work tracking application will affect your email server capacity as follows:

- Email notifications: email messages are typically less than 1 KB each.
- Depending upon configuration settings, the email notification engine can generate up to four notification messages per user per week.

Evaluate this added email traffic to determine whether to increase the storage capacity or network bandwidth allocated to your email server.