TimeControl®

Security Architecture

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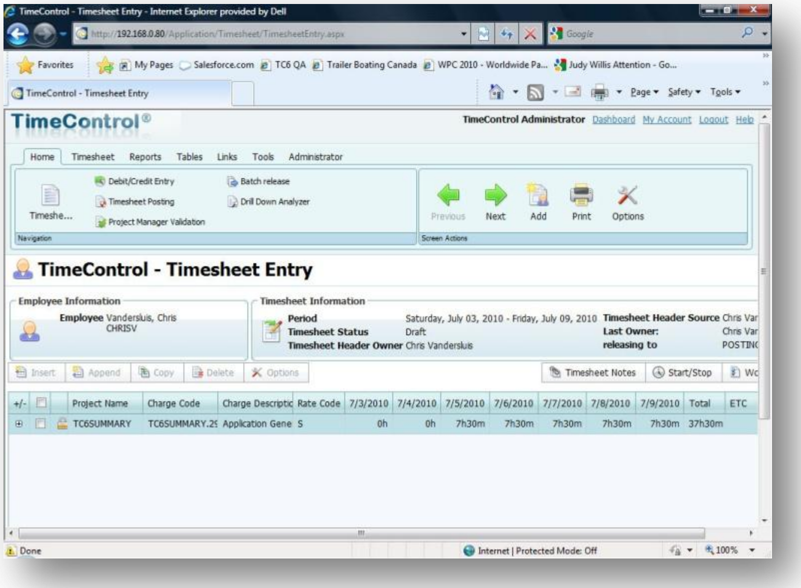
HMS has been designing corporate timesheet systems since its first project in 1983. Our clientele includes organizations in both the public and private sector. Whether the client is a 10 user IT company or a Fortune 1000 multi-national, the security of the TimeControl timesheet environment is a critical concern. A timesheet may be used for only a few minutes per week by most users but the data it contains can be used for the most sensitive requirements including billing, payroll, government regulation compliance or auditable tax purposes. HMS has designed TimeControl with these concerns in mind.



TimeControl - Timesheet Entry

Employee Information

Employee Vandersluis, Chris
CHRISV

Timesheet Information

Period Saturday, July 03, 2010 - Friday, July 09, 2010
Timesheet Status Draft
Timesheet Header Owner Chris Vandersluis
Timesheet Header Source Chris Var
Last Owner: Chris Var
releasing to POSTINC

+/-	□		Project Name	Charge Code	Charge Descriptic	Rate Code	7/3/2010	7/4/2010	7/5/2010	7/6/2010	7/7/2010	7/8/2010	7/9/2010	Total	ETC
⊞	□		TC6SUMMARY	TC6SUMMARY.2!	Application Gene	S	0h	0h	7h30m	7h30m	7h30m	7h30m	7h30m	37h30m	

Of any data for which the security is important, timesheet data is often considered the most sensitive. If used for payroll, timesheet data contains the salary costs per employee. If used for project management, timesheet data reveals the true actual costs of accomplishing elements of work. In the wrong hands, this data has the potential to cause heartache for management of the organization.

When we discuss security, we must first consider what we mean by it. Here we'll look at perspectives including database architecture, data encryption, the TimeControl communication layer, TimeControl functionality architecture, working across the Internet and related topics of interest such as firewalls, proxy servers, integrating with other access services such as LDAP and Active Directory.

This paper was written for those with a good understanding of technical issues such as firewall architecture and Internet Web-based security.

The fundamental driving force behind TimeControl security architecture is to a) deny access to unauthorized personnel to data they have not been granted access to, b) protect TimeControl data from unauthorized tampering or corruption and; c) to protect corporate infrastructure from using TimeControl to gain access to gain access to other corporate resources.

Database Access

TimeControl is fundamentally a database product. It does do calculations but is primarily designed to collect, summarize and report on data that has been collected in a very structured and stable manner. Access to and protection of the data is, therefore, our primary concern.

The TimeControl data architecture is designed with a 2-database structure. The primary database contains all the tables, fields, indices, constraints etc. that are required to operate the program. A secondary database is used for gateway purposes and contains only one table with one record and two fields.

One of the HMS design team's concerns was allowing access to this database to anyone who could reach the server. The use of the TCSECURE gateway database was designed to defeat this. The TCSECURE database contains a single username and password used to gain complete access to the TIMECONTROL main database where all the TimeControl data is contained. The TCSECURE data is encrypted with a method hard-coded into the TimeControl applications. This allows us to give out a username and password on machines which may require access without compromising the main database security.

When starting, the TimeControl middleware; the Administration Transaction Server (ATS) and the TimeControl Transaction Server (TTS) starts up and looks in its startup definition for the location of the TCSECURE database. It is given a username and password to access this database. Any administrator who has been given access to the ATS or TTS directories on this server will be able to read this username and password. Once the ATS or TTS has reached the TCSECURE database, it decrypts the username and password contained there to determine how to make a connection to the TIMECONTROL database. This username and password are not revealed to anyone. The only person who needs access to this data is the database administrator themselves. The ATS and TTS then establishes a connection to the database and stands by for requests from the client-access controls such as a TimeControl .Net control or ActiveX component to make a data request. All data is brokered through the middleware. End-users components are not given any knowledge of the database location and end-users never make a direct connection to the database.

This architecture allows a database administrator to allow more extensive access to the database for integration purposes without having to leave the data completely open. The database administrator is not concerned that there is data access to the TimeControl data aside from regular TimeControl traffic that is not authorized. This would allow, for example, a scenario where 3rd party reporting tools could be used to create reports from TimeControl data where the end-users are given read-only direct access to only certain elements of the TimeControl data.

Web Access and SSL

The architecture of a web interface application is such that a web-server such as Internet Information Services (IIS) contains web pages (either static or database-driven) which deliver a web-page to a web-browser that requests it.

This makes life very simple for the end-user. A user is given a URL such as timecontrol.mycompany.com, a user name and a password. The user enters the URL into a browser such as Internet Explorer or Firefox and is presented with a Login page. The user name and password are entered and the page then connects to the TimeControl middleware to determine if a login should be allowed.

We'll discuss the communications and control of TimeControl itself later in this paper. It's important to remember, however, that access to this first TimeControl login page itself can be controlled through standard-types of Web security.

First of all, Network security or web security such as .htaccess can control access to a page to make it available with certain restrictions. The security controls within the web server allow at a minimum to allow or deny different IPs or different Subnet masks to a given web site. This security could be used to ensure that company users who are on the corporate network only are given access to the TimeControl front page. This security can be extended to the entire Internet so that anyone who tries to get access to the corporate TimeControl site itself will be denied even seeing the log in screen until they enter the right user name and password to do so.

In addition, this can be combined with securing the TimeControl site within an SSL (Secure Socket Layer) area of your website. This technology results in all traffic to and from the page being encrypted by the web server. This allows even the movement of the user name and password to be encrypted before it arrives at the server. This will be of more interest for outward-facing TimeControl sites which can potentially be accessed via the Internet.

Password encryption

Okay, so you've got access to the TimeControl login page and now TimeControl would like to determine if you should be granted access to the application at all.

Once the login is complete, control of TimeControl communications is now passed to the ATS and TTS. TimeControl determines through its User profiles what menu items you should have access to and presents a menu with only those items.

Each user is given access to TimeControl based on a user name and a password. Within the TimeControl database a table is maintained of these values. The password values are encrypted within the database so that even if someone is given casual access to that table, they could not easily determine the password value for a user.

User name / password combinations are stored as encrypted temporary "session variables" by the web server for as long as the browser session is active. Once logged in, the user name and password are only transmitted back and forth in an encrypted form.

When each TimeControl component is accessed by the user, TimeControl determines if the session variable user name / password is still appropriate for this component. If so, it displays the component to the user. This prevents end users from trapping a full component URL then trying to access it later with a user name and password which should no longer deliver the component to the end-user.

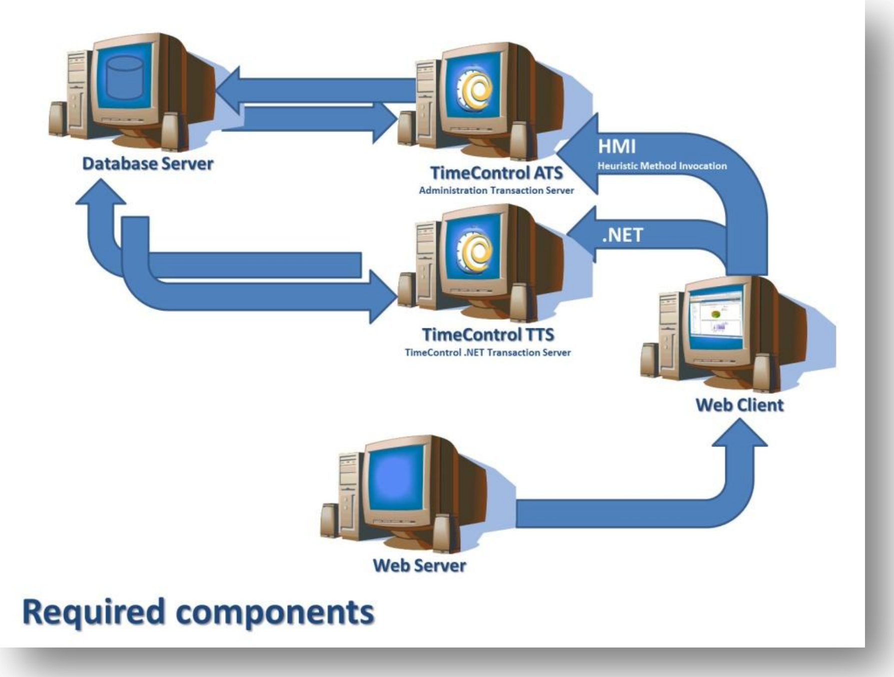
Session variables are designed to time-out after a set period of time so that even if the user leaves their screen open to TimeControl inadvertently, the log in session will expire automatically. This time out is configurable in the Web Properties file of the TimeControl server components

Middleware n-tier Architecture

Modern web-based interfaces are either all server-based, which means that all the processing occurs at the web-server and the client only sees what looks like a web page or they are thin-client architecture which means that some of the work occurs on the server and some of the work occurs at the client's station. TimeControl is a thin-client design.

With some of the work occurring in-between the client and the database, TimeControl's architecture has multiple levels. Each level is usually called a 'tier'. Because TimeControl has been designed to have an unlimited number of middle tier installations, TimeControl is defined as an n-tier application.

N-Tier design is important when we talk about security as it allows us to restrict access to corporate resources. Regardless of whether or not a firewall is implemented, end user components are connected only to the TimeControl middle tier, not ever directly to the database server allowing us to protect the database server much more stringently.


Database Server
TimeControl ATS
Administration Transaction Server
HMI
Heuristic Method Invocation
.NET
TimeControl TTS
TimeControl .NET Transaction Server
Web Client
Web Server
Required components

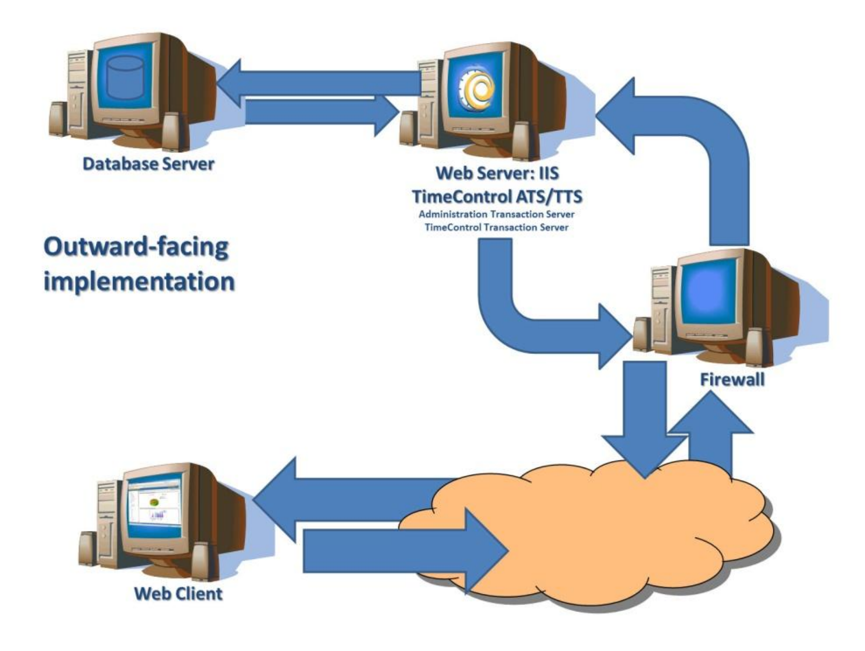
The sequence of events in making TimeControl function is as follows:

1. The end-user web browser accesses the TimeControl login web page on the web server.
2. A TimeControl component at the Web Server communicates with the TimeControl Administration Transaction Server (ATS) middleware and the TimeControl Transaction Server to determine if the user should be granted access and, if so, what menu items should be displayed
3. The Web Server sends the TimeControl menu back to the client's web browser with instructions to the TimeControl components on how to connect to the middleware
4. The TimeControl components are activated by the end user by selecting a menu item
5. If the component is an ActiveX, the selected TimeControl component then communicates directly with the middleware. This communications layer is completely encrypted. If the component is a .Net (such as the timesheet) then the component

communicate via the web server and the .Net protocol which is also completely encrypted.
6. The TimeControl middleware brokers any traffic and makes the appropriate interaction with the database server.

At no time does the end user machine communicate directly with the database server unless either the web server computer or the middleware computer are also hosting the database.

If a firewall is in use, a port on the middleware machine must be exposed in this scenario for the TimeControl components to be able to communicate with the middleware.


Database Server
Web Server: IIS
TimeControl ATS/TTS
Administration Transaction Server
TimeControl Transaction Server
Outward-facing implementation
Firewall
Web Client

Obviously the most secure implementation of TimeControl is to disallow access to any part of TimeControl from outside the network. This can be accomplished with network and web security and blocks all access to the servers in question. If, however, you wish to allow traffic from outside the network, then the most secure implementation of TimeControl without using a proxy server is the following:

1. Have the database server not be the same machine as the middleware server
2. Have a firewall installed in which only a single port to the middleware machine is opened for TimeControl access.
3. Aside from TimeControl middleware and web server services, run no other internet services on this machine
4. Masquerade the database server so that it is not visible outside the firewall

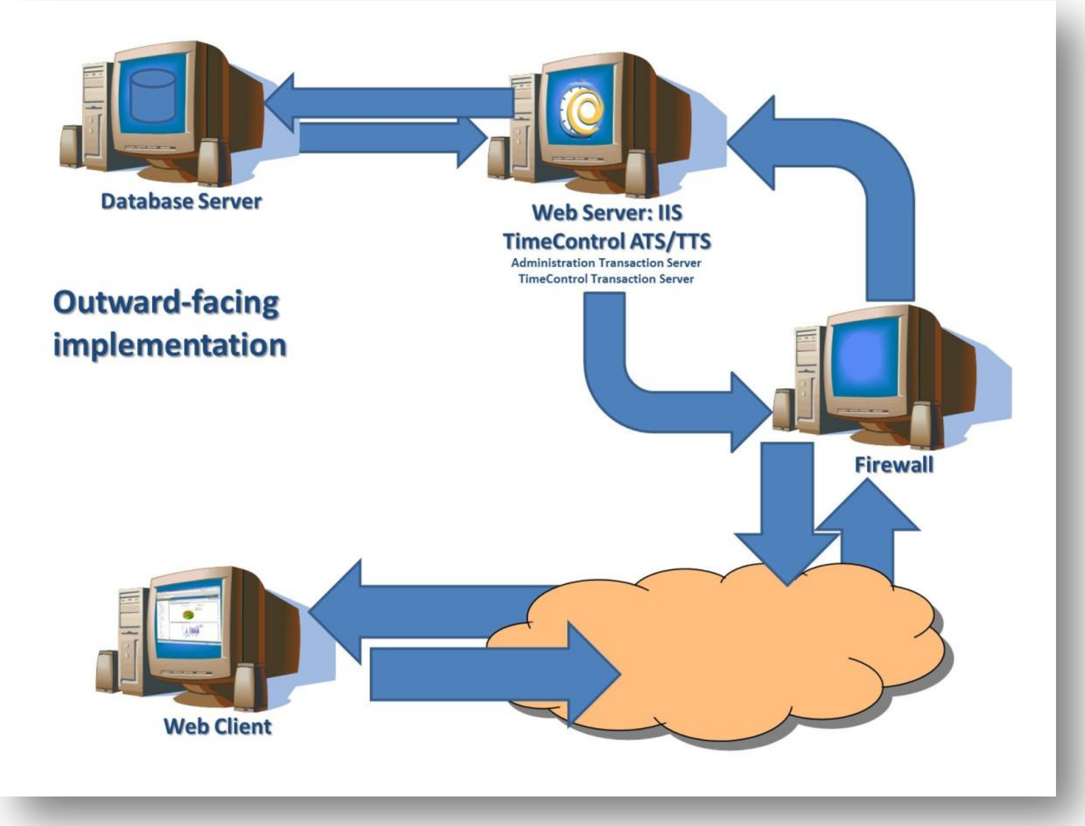
This is a very secure environment. The only area which is even vulnerable to attack is traffic on its way from the web browser client outside the network to the middleware machine inside the network. A worst-case scenario is that traffic to or from the middleware would be corrupted through malicious intent and this traffic is encrypted with an advanced encryption algorithm. Since the middleware only accepts data that meets the proper business rules anyway, this type of attack would, at worst, cause an erroneous transaction, which would be rejected by the transaction server.

A port must be opened at the middleware server for Administrators who will require access to ActiveX components for administration purposes. This port can be restricted to only those

Administration computers which require access to these functions. With an open port at the middle-ware transaction server one could argue that this machine is vulnerable to a hacker attack. If so, there is no data stored on this machine and, if masquerading and a firewall is in place, nowhere to connect to past that machine. The worst-case scenario should a skilled hacker be able to penetrate the server through the single firewall port would be a reinstallation of the middleware on the transaction server. This has never happened to a TimeControl client.

Should an environment require even more stringent security, TimeControl supports the use of a proxy server. This is discussed in the next section.

TimeControl includes the capability of implementing the ultimate in security architecture using a proxy server. Using a proxy server essentially redirects traffic through your web server's open port to an internal machine that is not otherwise available outside the network.


Database Server
Web Server: IIS
TimeControl ATS/TTS
Administration Transaction Server
TimeControl Transaction Server
Outward-facing implementation
Firewall
Web Client

This allows the standard web security that is part of every web server to intercept and evaluate traffic. It also allows the internal middleware server to be completely hidden from access from outside the network at all. A proxy server is accomplished by registering a redirector with the web server that knows how to interpret TimeControl traffic that arrives from the end user browser.

Setting up a proxy server environment is technically more complicated to install than any of the other TimeControl installations. HMS technical staff can assist with such a deployment in highly sensitive areas where such a deployment is required.

TimeControl also supports multiple instances of both the web server and the middleware transaction servers. This allows, in the largest of TimeControl implementations the capability of a web-farm architecture and load balancing. By using such a structure a TimeControl implementation could be created that would support a virtually unlimited number of users. TimeControl has been architected for up to 100,000 users within a single system.

LDAP and Windows Active Directory

Some clients will wish to control all application access to TimeControl from Active Directory or Lightweight Directory Access Protocol (LDAP) . TimeControl supports all of these authentication methods as well as its own security model.

In the TimeControl User Table, select TimeControl Security, or Active Directory / LDAP as the authentication type. You may be asked for the location of the LDAP or Active Directory Server. A password needs be entered into TimeControl only if the TimeControl Security type is selected.

TimeControl will take the User name and Password combination that are used during the login and validate them according to the method selected. If the method was TimeControl Security, TimeControl will search the TimeControl User database for the encrypted password. If the method was NT Authentication, TimeControl will call check the server machine itself using the NT Authentication module, pass the User Name and Password to it and wait until the server returns a pass or fail reply. If the method was Active Directory or LDAP, TimeControl will send the User name and Password to the Active Directory or LDAP server and wait for a pass or fail.

This is sometimes desirable in very large organizations when the management of new users, security for various applications and security on servers etc., is a huge undertaking. TimeControl is an application that is often distributed to virtually every employee so storing the passwords for TimeControl access in LDAP/Active Directory means one less password for employees to remember.

An import of information from LDAP or Active Directory can be used to populate user names for the first time when TimeControl is implemented.

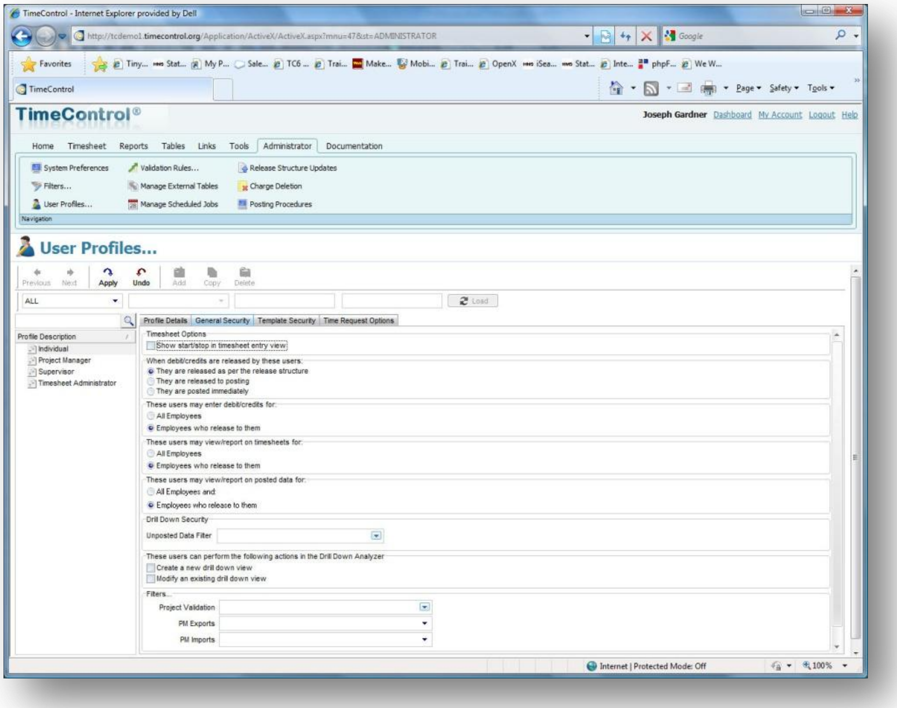
Access to TimeControl is something that should be rigorously managed. Timesheets, while they take up a minimal part of one’s week, contain data that is considered among the most sensitive in the entire organization.

Entering information for a new employee in TimeControl involves more than just the user name and password. Depending on the configuration of a given implementation, numerous fields and entries might need to be populated to define a wide range of properties of that employee for reporting and analysis purposes with any timesheet data entered. Also, rate information is often entered on an employee-by-employee basis.

This is why access for new users is more often keyed off the human resources system than imported from the LDAP. In some TimeControl implementations, direct links have been established to trigger a direct entry of TimeControl by the database itself. Database triggers can be established to move all the pertinent data from the HR or payroll system to TimeControl in order to properly enter all data required by the system to get the employee started with TimeControl.

Once in TimeControl itself, there are extensive security structures in place to ensure that users are presented only with the functionality and data they require. The most significant of these is managed through the User Profile area. User Profiles is part of each of the TimeControl editions. This architecture ensures that users are not required to wade through areas of the system that are of no interest to them trying to find the functionality that they do require. This makes end users more effective when using TimeControl.

This same architecture ensures that only the data appropriate to that user is visible. The User Profile area is divided into two sections. The Data Section determines which open timesheets and which posted timesheet data can be viewed. An Administrator can define roles such as a supervisor who can see only data for people below them in a release structure or define the data explicitly through the use of filters.


TimeControl - Internet Explorer provided by Dell
http://tcdemo1.timecontrol.org/Application/ActiveX/ActiveX.aspx?mnu=47&st=ADMINISTRATOR
Google
Favorites
Tiny... Stat... My P... Sale... TC6 ... Trai... Make... Mobi... Trai... OpenX iSea... Stat... Inte... phpF... We W...
TimeControl
Page Safety Tools
TimeControl®
Joseph Gardner Dashboard My Account Logout Help
Home Timesheet Reports Tables Links Tools Administrator Documentation
System Preferences
Validation Rules...
Release Structure Updates
Filters...
Manage External Tables
Charge Deletion
User Profiles...
Manage Scheduled Jobs
Posting Procedures
Navigation
Previous Next Apply Undo Add Copy Delete
Load
Profile Details General Security Template Security Time Request Options
Internet | Protected Mode: Off
100%

User Profiles...

ALL

Profile Description
- Individual
- Project Manager
- Supervisor
- Timesheet Administrator

Timesheet Options
□ Show start/stop in timesheet entry view

When debit/credits are released by these users:
● They are released as per the release structure
○ They are released to posting
○ They are posted immediately

These users may enter debit/credits for:
○ All Employees
● Employees who release to them

These users may view/report on timesheets for:
○ All Employees
● Employees who release to them

These users may view/report on posted data for:
○ All Employees and
● Employees who release to them

Drill Down Security
Unposted Data Filter

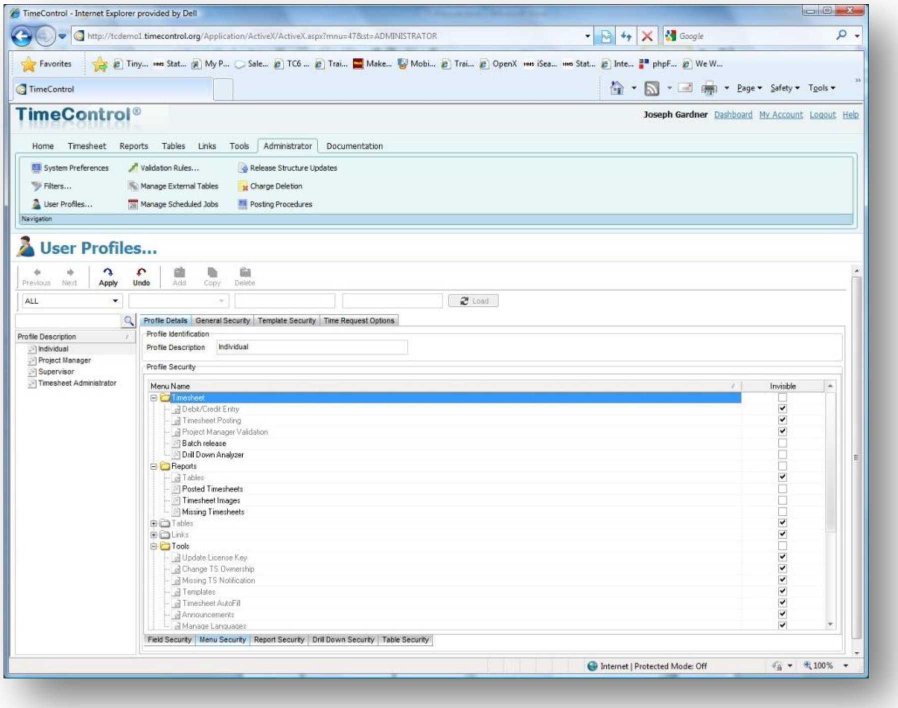
These users can perform the following actions in the Drill Down Analyzer
□ Create a new drill down view
□ Modify an existing drill down view

Filters...
Project Validation
PM Exports
PM Imports

In addition to the data restrictions put on reporting and exporting by User Profiles, end users can also be restricted during data entry from seeing different project and charge code selections by imposing employee-level filters in the employee tables. This ensures that only data that is appropriate to the proper level of use is seen.

The second area of User Profiles is a lower level of detail. The Details tab controls first the functions that are available to each user. This allows an administrator to hide completely any aspect of the program including such things as table access, exporting functionality, project linking functionality, definition and configuration areas etc. This type of function-by-function security is essential in such an application.

The Menu Security area can be defined at any level of the menu. Top level entries result in that entire tree of the menu structure to be made invisible. If a particular user requires use of a menu item somewhere in the tree (for example just one of the tables), each other item in that area must be made invisible.



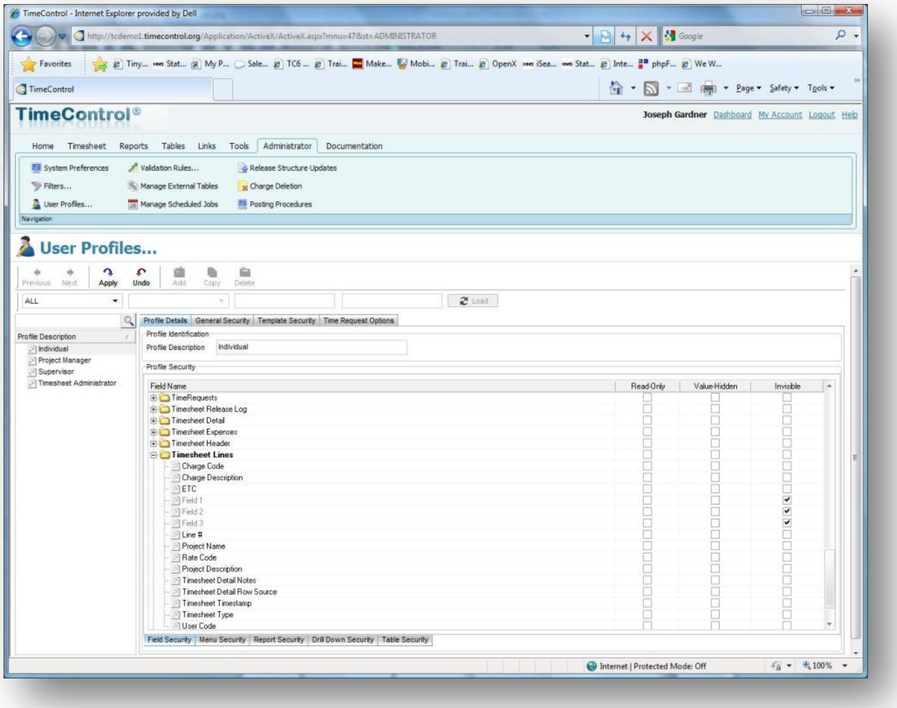
Profile Identification

Profile Description: Individual

Profile Security

Menu Name	Invisible
Timesheet	☐
Debit/Credit Entry	☑
Timesheet Posting	☑
Project Manager Validation	☑
Batch release	☐
Drill Down Analyzer	☐
Reports	☐
Tables	☑
Posted Timesheets	☐
Timesheet Images	☐
Missing Timesheets	☐
Tables	☑
Links	☑
Tools	☐
Update License Key	☑
Change TS Ownership	☑
Missing TS Notification	☑
Templates	☑
Timesheet AutoFill	☑
Announcements	☑
Manage Languages	☑

The Report Security works just like the Menu Security area except that it occurs at the report listing level. This allows an administrator to give access to some report but not all reports and define the access, report by report. Remember, that the Data Security already discussed comes into effect whenever a report is offered. This ensures that even if a report format is available to a user, they will not be able to see data to which they do not have rights.



Profile Identification

Profile Description: Individual

Profile Security

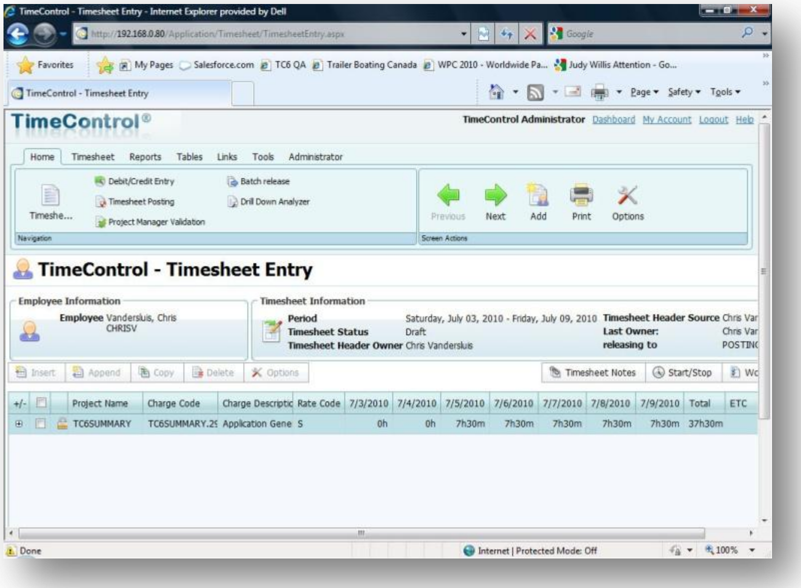
Field Name	Read-Only	Value-Hidden	Invisible
TimeRequests	☐	☐	☐
Timesheet Release Log	☐	☐	☐
Timesheet Detail	☐	☐	☐
Timesheet Expenses	☐	☐	☐
Timesheet Header	☐	☐	☐
Timesheet Lines	☐	☐	☐
Charge Code	☐	☐	☐
Charge Description	☐	☐	☐
ETC	☐	☐	☐
Field 1	☐	☐	☑
Field 2	☐	☐	☑
Field 3	☐	☐	☑
Line #	☐	☐	☐
Project Name	☐	☐	☐
Rate Code	☐	☐	☐
Project Description	☐	☐	☐
Timesheet Detail Notes	☐	☐	☐
Timesheet Detail Row Source	☐	☐	☐
Timesheet Timestamp	☐	☐	☐
Timesheet Type	☐	☐	☐
User Code	☐	☐	☐

The last area is quite unusual in an application like TimeControl. It allows security to be established field-by-field. The Field Security area of TimeControl allows virtually any field to be declared Read-only, Value-hidden, or Invisible. Declaring the field “Read-only” makes the field non-editable in any table where it is displayed for this user. Declaring it “Value-hidden” leaves the field visible buy won’t show the value within the field. This will also result in data not being displayed for this field if the field is contained in a report run by this user.

Declaring a field “Invisible” makes not only the field, but also the field’s label to not be displayed. If the field exists in a report definition, the field column and data will be suppressed at run time when run by a user with this restriction.

> Here’s an example, of where Field Security might be critical:
> TimeControl supports approximately 1300 rate codes per employee. For each rate code, TimeControl maintains 2 values. These values are often used to track internal costs such as actual salaried costs vs. external costs such as billing or project costs. A project manager might be given access to the external cost fields within the rate table but not be allowed to scroll through the rates to see the salaries of all the employees. For the project manager, the 2nd field would be made invisible. Yet a human resources employee might be given access to the rates table to update the actual salaried costs. For this person, the project field would be made read-only to ensure the billing value would not be updated inadvertently.

In today's challenging economy, tracking productivity is more important than ever. It is no longer enough to know only how much time has been spent. Now management demands that you know what was done with the time. Many organizations are turning to project and task based management as a way of being more effective. One of the most difficult aspects of implementing project control is the capture and approval of labor actuals. *TimeControl* provides an electronic timesheet system designed to serve both Finance and Project Management



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⊞	□		TC6SUMMARY	TC6SUMMARY.2!	Application Gene	S	0h	0h	7h30m	7h30m	7h30m	7h30m	7h30m	37h30m	

Open Architecture

TimeControl is an open architecture system which supports a variety of databases including Microsoft SQL Server, Oracle, Sybase and MySQL. Customizable user profiles allow the *TimeControl* interface to be tailored to each user's requirements.

Easy to use web interface

TimeControl's interface is browser-based and user-intuitive. User Profiles determines what the user will be presented with and the user can define where TimeControl should start and what defaults they wish. End users can use a variety of browsers such as Internet Explorer, Firefox, Chrome, Safari, Mozilla or even an iPad. (Administrators must use Internet Explorer.)

Multi-lingual

We know that not ever user speaks English as their first language. TimeControl comes with a number of languages already in the system but every label and every message is open to the TimeControl Manage Languages module so you can change the existing translations or even add your own. This is a great feature for adjusting terminology in the system to match your organization's (The only word you can't change is: "TimeControl")

Timesheet Approvals

TimeControl supports HMS Software's unique Matrix Approval Process for Labor Actuals which allows for quick authorization of project data. This process resolves the inherent conflict that is found when both the financial and project management hierarchies must approve timesheet data simultaneously. Automated validation of timesheet data is handled by

TimeControl's remarkable Validation Rules . Additional approvals can be done manually with a simple Approve/Reject or Approve Update process. The Project Manager Validation screen displays an easy-to-view hierarchical interface for managing project approvals.

Total Flexibility with User Profiles

TimeControl's User Profiles allows the Administrator to determine which menu choices, reports and fields are accessible by each user. The entire interface can be tailored to the user's individual needs. No other system on the market today offers this much flexibility.

Field level security ensures that only the information which is important to each user, is displayed. Fields can be made read-only or invisible, removing them from view entirely. This makes *TimeControl* at once a secure, deployable system and an easy-to-use one as well.

Links to Project Management Systems

TimeControl includes direct links to project management systems such including Deltek's Open Plan and Cobra, Microsoft's Project, and Project Server, and Oracle-Primavera.

Integrating with a project management system drastically reduces timesheet errors as only valid tasks will be available in which to charge time. Hours entered in *TimeControl* are returned directly to the project management system as activity and resource progress.

TimeControl also supports customizable export formats for integration with virtually any financial or HR system.

Vacation Approvals with TimeRequest

The TimeRequest module allows users to make a request for certain types of times to be approved for entry in future timesheets. The most common application of this module may be for requesting Vacation time off. Once approved, the time is then automatically entered by TimeControl into the appropriate timesheet in the future when that timesheet is created.

The TimeRequest module is, however, not restricted to just Vacation requests. Any category of time can be exposed to the module. This allows an infinite number of applications such as for travel time, training time, offsite or onsite time or any other type of time category where the organization wishes it to be approved in advance.

E-mail Enabled

TimeControl allows email notification to be sent for various events such as missing timesheets, incomplete or non-approved timesheets as well as timesheets that were rejected or re-released for approval.

Expense Reports

TimeControl includes extensive expense report functionality. Users can enter an unlimited number of expense report items for each timesheet line.

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Reporting

TimeControl's reporting engine looks just like Excel™. Reports can even be saved in Excel or HTML format.

TimeControl's Reporting Wizards make report generation easy. *TimeControl's* field-level security is always active so only the fields which a user has permission for will be shown.

Predefined reports are available in a variety of formats which include posted timesheet data, table lists, printouts of the timesheets themselves and missing timesheet reports.

Easy to use Interface

- Full web-based browser interface with multiple browsers supported
- TimeControl can be implemented within a SharePoint interface or a Microsoft Project Web Access interface
- Scaleable user profiles facilitates use for data entry users yet provides full functionality for administrators
- Multilingual with multiple languages included
- Unlimited charge codes displayed in simple, hierarchical drop-down lists
- Unlimited free-form notes for each line item and each timesheet
- E-mail-enabled. E-mail messages sent for system notices such as rejected timesheets or missing timesheets
- Scheduleable E-mail notification for missing or unapproved timesheets.
- Predefined timesheets based on resource assignments from the project management system or by user input

Robust Architecture

- Open database architecture; support for Oracle, Microsoft SQL Server, Sybase and MySQL datazbases
- N-tier architecture makes system scaleable for 10 to 100,000 users
- Unlimited rate codes per employee
- Field-level security. Make any field visible, value read-only, or invisible
- Complete redefinition of every field label
- Complete auditability of timesheet data
- User-defined fields on every table
- Add pop-up data validation for each user-defined field
- Allows charges to be linked to a specific project or project-independent
- Multiple overhead charge types
- Filter charge codes, projects and rates visible to any employee

Web Interface

- MyTimeControl™ home page dashboard gives extensive and customizable dashboard information to employees

Approval Process

- HMS's unique *Matrix Approval Process for Labor Actuals™*
- Unlimited automatic Validation Rules are user defineable, flexible and can be applied globally or to any group or even an individual
- Unlimited manual validation levels in which each employee can have a unique approval routing
- Project Managers or Account Managers can preview and redistribute hours prior to linking with a project management system or exporting to Finance

Links to Project Management

- Direct integration with popular project management systems such as Microsoft Project and Project Server, Primavera and Deltek's Open Plan and Cobra
- Supports multiple project management systems and multiple versions simultaneously
- Customizable import/export function to interface with virtually any finance or ERP system including SAP, Oracle, PeopleSoft and Microsoft Dynamics
- Interface can be integrated directly into SharePoint, Microsoft Project Web Access or stand alone

Time-off Request

- **TimeRequest**™ module allows vacation, personal or other leave time to be requested
- TimeRequest allows multiple levels of approval
- TimeRequest automatically populates future timesheets with approved time off

Flexible Reporting

- Excel-like reporting format allows output to any Windows-compliant printer or reports can be saved as Excel, XML or HTML files
- Reporting Wizards allow an unlimited number of reports to be created and saved for later use
- Unlimited levels of data selection, filtering and sorting
- Drill Down Analyzer provides instant ad-hoc analysis of data at any level

Expense Reports

- Users can enter non-labor costs on their timesheet
- Unlimited number of expense items per timesheet line item
- Expenses can be tracked back to a project management and/or finance system

Government Compliance

- Complies with requirements for DCAA, European Time Directives, FMLA, the California Wage Laws and Sarbanes-Oxley

Hardware Requirements

- Server:
  - Windows Server 32 or 64 bit
  - .Net 3.5
  - Internet Information Services
  - MS SQL Server, Oracle, Sybase or MySQL database
- End-user Workstation
  - Web browsers: Internet Explorer, Safari, FireFox, Mozilla
- Administrator Workstation
  - Web browsers: Internet Explorer

HMS Software Partial Client List

Engineering/Construction

Aecon Construction
AeroInfo
Koch Business Solutions
Kongsberg Devotek
Thompson Beta

Gas / Utilities

Gulf South Pipeline
Acergy
Petrocon
VenCorp
Foster Wheeler

Manufacturing

Alcan
Parker Hannifin
Georgia Pacific
Ultra Electronics
Tennant
Wagner Spray Tech
Vision Systems
Electro Motive
GE Sensing
Tommy Hilfiger

Defense / Aerospace

Bombardier Inc.
CAE Electronics
Lockheed Martin
Rolls Royce
SAAB
Army Corps of Engineers

Government

Amsterdam Port Authorities
Atlanta Airport
Dutch Railway
Government of Saskatchewan
Railway Procurement Agency (UK)
Ville de Montreal
City of Winnipeg

Technology

Arivia
CSI Piemonte
EDS
Face Technology
Fuel Plus Software
GE Access
Microsoft
Positron
Psion Teklogix
Inventure
Fujitsu

Telecommunications

Cable & Wireless Bartel
Ericsson
EXFO
Motorola
Philips Semiconductors
SARA Amsterdam
Stratos Global

Financial

Standard Life
Development Bank of Canada
Alliance One
Centre de Recherche Informatique de Montréal

Health/Pharmaceutical

Boehringer Ingelheim
National Health Service (UK)
Azko Nobel (Organon)
RTS Thurnall
Canadian Institute for Health Info
Iogen
Registrat

Education

Johnson and Wales University
Eastern Michigan University
Queens University
McGill University

About HMS Software

HMS Software, a division of Montreal, Canada-based Heuristic Management Systems Inc., is a leading provider of enterprise timekeeping systems for project environments.

Founded in 1984, HMS Software's expertise in implementing enterprise project-oriented and activity-based-costing systems is recognized worldwide by some of the world's largest organizations. Project oriented products and services from HMS have been used to plan some of Canada's most recognizable products including the Hibernia Oil Platform, Hydro Quebec's James Bay development, Ontario Hydro's nuclear station refurbishing and InterProvincial Pipeline's cross-country pipeline network.

HMS's signature product, TimeControl, an enterprise timekeeping system designed to serve the needs of both Finance and Project Management, is distributed worldwide through an extensive list of distributors and dealers located on every continent with representatives in the US, the UK, Australia, Mexico, Europe, Asia, South Africa and the Middle East.

HMS Software's client list includes some of the world's leading corporations in the telecommunications, IT, finance, engineering, defense/aerospace and government sectors including such organizations as Acergy, Aecon Construction, Alcan, the Atlanta Airport, Akzo Nobel, The Canadian Business Development Bank, The City of Montreal, EDS, Ericsson, General Motors, the Government of Saskatchewan, John Deere, Kelly Services, The UK’s National Health Service, Standard Life, UPS, Volvo Novabus and hundreds of others.

HMS maintains offices in Montreal, Quebec and Toronto, Ontario.
For more information about HMS, please visit our website at www.hmssoftware.ca.

TimeControl

First published by HMS in 1994, TimeControl has been adopted as an enterprise-wide timekeeping system by hundreds of clients and over 100,000 users around the world. TimeControl is designed specifically as an activity-based-costing application and includes such features as hierarchical user structures to allow for multiple levels of timesheet authorization and an open data architecture which makes the product ideally suited for integration with existing data systems in any organization. TimeControl supports numerous database standards including Oracle, Sybase and Microsoft SQL Server. For more information about TimeControl please visit: www.timecontrol.com.

Strategic Services

In addition to being a publisher of enterprise timekeeping software, HMS provides a full range of support services including technical support, training and consulting tailored to meet clients' specific needs. HMS Software consultants are skilled in activity-based-costing, timekeeping methodology, project management techniques, cost and earned-value management as well, of course, in the HMS-supplied products. For more information about HMS Software services, please visit www.hms.ca.