Attendance Enterprise Architecture

Introduction

This document describes the Attendance Enterprise architecture. It examines architecture from several perspectives, all of which adhere to Microsoft® architecture principles.

Microsoft Architecture Principles

Attendance Enterprise is built to exploit Microsoft technologies and is fully plug-in compatible with existing Microsoft standards for operator authentication (NTLM), database management (MSSQL), application installation (MSI/ActiveDirectory), content providers (IIS), browser clients (IE6) and inter-process communications (TCP/IP).

The design of Attendance Enterprise adheres to the Microsoft principles of scaling capacity through multiple Windows NT based servers. Workload is distributed by functionality and supports workload redirection between clustered server farms.

Architecture Views

The following sections present Attendance Enterprise from several architectural views, including conceptual, layered component, and processing views. It also describes key areas of concern in architecting and implementing a robust, reliable, manageable, and scalable enterprise solution.
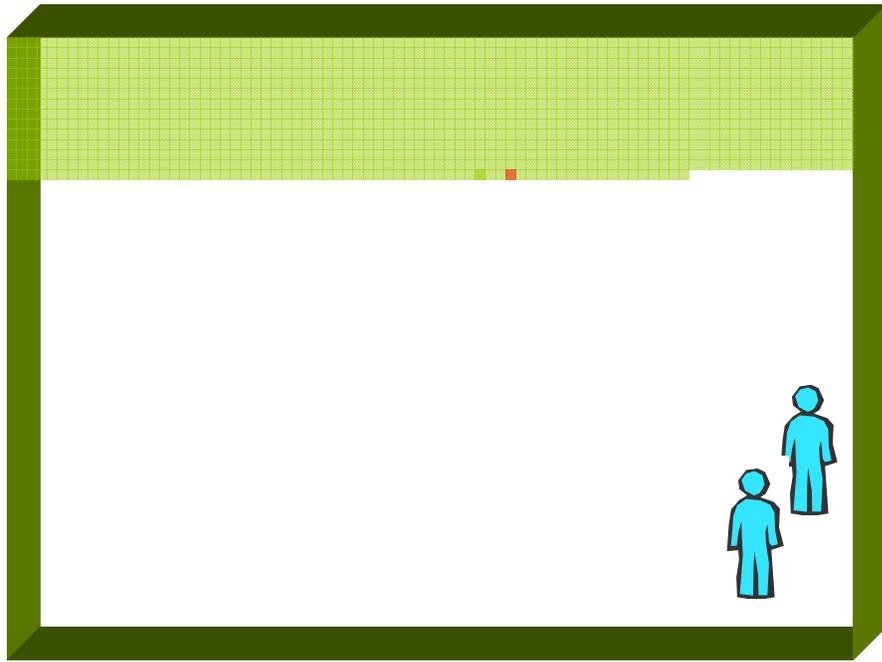
Attendance Enterprise Conceptual View

InfoTronics Attendance Enterprise software is designed to address the complex time and attendance needs of large organizations. Attendance Enterprise meets the scalability and reliability requirements for automating, analyzing and managing employee labor data. It is cost-effective, easily deployed and fits seamlessly into existing computing environments.

Labor Management

Attendance Enterprise instills discipline, consistency, and automation into the labor management process. The labor management process optimizes employee resources, with the goal of efficient labor allocation, high productivity, and lowest possible labor cost.

The process begins with labor forecasting and budgeting. Managers enter budgets in Attendance Enterprise and schedule employees accordingly. Employee schedules can incorporate departmental transfers, supporting the borrowing and lending of employees. Attendance Enterprise collects employee and supervisor transactions and monitors employee movement throughout the day.

Comprehensive reporting of labor coverage, labor cost, and time allocation to each work area helps with the evaluation of labor strategies. Attendance Enterprise reports include comprehensive analysis in the form of actual vs. scheduled labor cost and actual vs. budget labor costs.
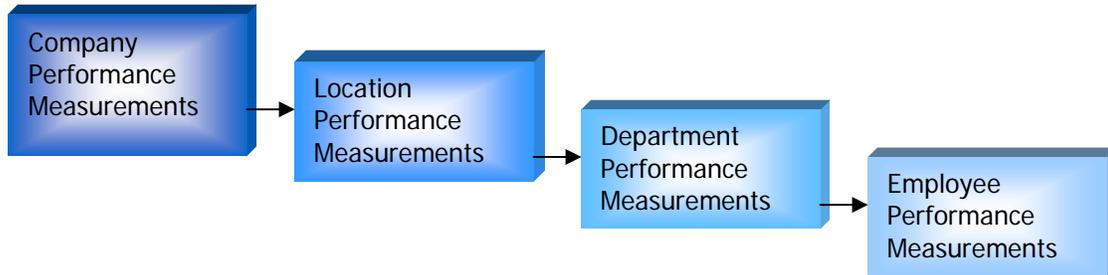
Attendance Enterprise Incidents and Points module measures employee behavior against corporate attendance policies and automates enforcement. It assigns point values to attendance habits, such as tardy exceptions or perfect attendance during a user-specified period. It maintains a point balance for employees, with good behavior compensating for poor performance according to each company's rules. Attendance Enterprise can automatically notify supervisors, generate letters to employees, and modify employee status based on point rules.

Benefit Administration

Attendance Enterprise provides comprehensive benefit administration capabilities. It automatically enforces corporate rules and limits for granting benefits (administrators adding benefits, such as vacation and sick time, to employee benefit banks) and using benefits (employee taking a paid personal day off). Benefits can be scheduled ahead of time (such as pre-approved vacation time), and deducted from the benefit bank and paid to the employee automatically.

Attendance Enterprise Benefit Accruals Module provides automated accrual of benefits, such as sick, vacation, and personal time, based on rules that can be tailored to company policy. Employee benefit banks are automatically credited and debited without administrator intervention.

Mobile Workforce and Tools

Attendance Enterprise offers web components that engage and inform employees. Employee Self Service (ESS) provides web access for employees to view their schedules, time cards, and benefits. They can perform transactions such as in and out punches and requesting time off. ESS is available where ever employees have access to the internet – at home, at branch offices, on the road.

Employee Kiosk provides a browser based interface for employee inquiries, viewing time cards and schedules, punching in and out, and performing other transactions such as departmental transfers. They are typically located in common areas, such as lunch rooms and common work rooms. Punch transactions are also available to internet cell phone subscribers, making Attendance Enterprise available to mobile employees.

Manager Self Service provides web access for executing critical supervisor functions within Attendance Enterprise. Managers can view employee information, perform transactions, and make changes to time cards, schedules, and other information. Strategic labor and performance data and analysis is available securely over the internet.

Attendance Enterprise Layered Component View

Attendance Enterprise adheres to a layered architecture. Its components can be grouped into hierarchical layers, as depicted in the following figure.

Presentation Layer

- Client UI
- Web Components
- Reporting

Performance Management Layer

- Scheduling
- Leave Management
- Budgeting
- Incidents & Points

Business Rules Layer

- Time Card Engine
- Parameter Engine
  - Accruals
  - Incidents

Administration Layer

- User Rights
- System Configuration
- Supporting Utilities

Data Collection Layer

- Time Recorders
- Kiosk/ Web/ Telephony
- Import/ Export

Database Layer

Presentation Layer

The presentation layer includes components that assemble and present Attendance Enterprise information and analysis to users.

Client UI

The Client is the workstation-based user interface for Attendance Enterprise. It is dynamic and customizable, adapting visible elements and data to user authority and user preferences. The user interface is based on the Microsoft Outlook frame design. Design elements such as toolbars and shortcuts are identical to those found in Microsoft Office.
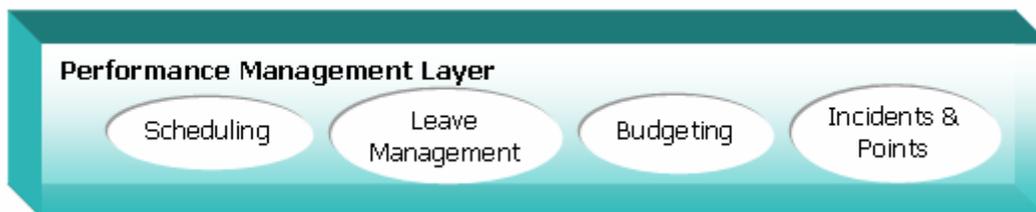
Web Components

Web Components provide employee access to time cards, benefit information, and personal information over the internet. Employees can perform functions such as punching in and out and requesting time off. Interfaces include browser based application, a button-style kiosk, and WML cell phone punching. Web components also include a manager's application that supports time card edits and scheduling. Web components can be customized easily to meet different companies' UI design standards.

Reporting Component

The Reporting Component provides dozens of predefined reports to help analyze employee attendance and labor costs. In addition, it supports user-defined columnar reporting, as well as custom reporting using third party reporting tools such as MS-SQL tools, Microsoft Access, Crystal Reports, and so on. Reports can be printed or e-mailed on demand or automatically at predefined times.

Performance Management Layer

The performance management layer includes components that help supervisors, managers, and executives evaluate their labor cost efficiency and employee attendance performance.

Scheduling Component

The Scheduling Component provides advanced scheduling capabilities. Employee schedules optionally include work group transfers and rate changes. Schedules can be applied automatically, repeating at a specified interval. The Scheduling Component feeds information to the Time Card Engine, which effects any transfers or rate changes and also uses schedules to provide estimating capabilities.

Leave Management Component

The Leave Management Component automates the process employees use to request time off. It presents requests to supervisors and gives them tools for evaluating leave requests against schedule coverage, other requests for the same time period, and the employee's projected benefit balances. When requests are approved, the Leave Management Component communicates with the Scheduling Component to change employee schedules automatically.

Budgeting Component

The Budgeting Component lets managers create a labor budget or paid leave budget for a group of employees. Supervisors use the budget, which is defined in hour or dollar amounts, as a guide for efficient scheduling. As each shift is scheduled, the Budgeting Component calculates and displays its impact on the budget. In addition, the component provides analysis and reporting of actual hours worked and labor cost against budget.

Incidents & Points Module

The Incidents & Points Module measures employee attendance against rules defined for the company, department, or group. You define point values for incidents such as tardiness or unexcused absences. Points are impartially and uniformly applied to all employees based on their attendance history.

Point rules are defined and calculated in the business rules layer. Results are reported to managers and corrective measures, such as letters, notifications, and change of employment status, are part of the performance management layer.

Business Rules Layer

The business rules layer contains components that tailor Attendance Enterprise operation to the rules and policies of each organization.
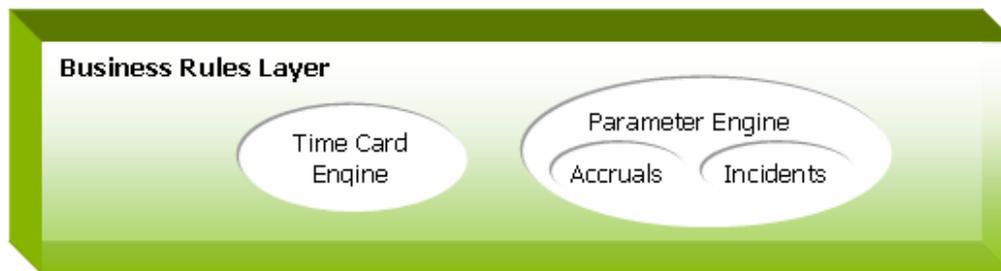
Parameter Engine

Parameters customize the operation of Attendance Enterprise to reflect company policies and enforce wage and hour laws such as FMLA and FLSA. The Parameter Engine determines how key calculations are carried out in the Time Card Engine, Benefit Accruals module, Points & Incidents module, and elsewhere in the Attendance Enterprise system. Designed for adaptability and flexibility, customer pay rules are implemented without programming. Changes can easily be implemented as policies mature, minimizing the cost of change.

Time Card Engine

The Time Card Engine assembles raw employee transaction data into a time card composed of coherent shifts. Based on parameter settings, it applies schedules to shifts and determines exceptions to scheduled or expected attendance. It performs pay calculations, such as overtime and premium pay, and assigns hours and pay to work groups (such as locations and departments) for budgeting and tracking purposes.

Administration Layer

The administration layer contains components that are used to set up the Attendance Enterprise system and its users.

User Rights Management

Attendance Enterprise supports a comprehensive and specific set of user rights. Administrators can grant or deny access to particular areas or functions of the system. Access to information can be restricted by information type (for example, preventing access to wage data or social security numbers) and by ownership (for example, allowing access only to employees in a certain department).

System Configuration

The Attendance Enterprise user interface can be customized for individual users or groups of users. Toolbars, predefined reports, customized summary sheets and exception views can be defined for a user group and propagated automatically to all member users. In addition, administrators can create prototype users and copy their user rights and customizations to other users.

Supporting Utilities

Attendance Enterprise provides a family of utilities that assist in the installation, upgrade, and maintenance of an enterprise-wide Attendance Enterprise installation.

Data Collection Layer

The data collection contains the components that gather raw employee and supervisor transaction data and write them to the database.

Time Recorders

Attendance Enterprise supports and interacts with various time recorders manufactured by InfoTronics or other vendors. Time recorders can use card reader, biometric, proximity, and PIN technology for capturing data. Attendance Enterprise provides communications components for configuring the time recorders and polling them to retrieve transactions. It also supports networked time recorders that write directly to the database.

Web/Kiosk/Telephony

Transactions and employee data can be collected through Attendance Enterprise Web Components. In addition, employees can punch in and out through web enabled mobile phones and perform a variety of transactions through supported telephone systems.

Import/Export

Employee data that is already defined or stored in other applications can be integrated into Attendance Enterprise through comprehensive employee and transaction imports. Likewise, employee data and transactions can be exported for use by other systems such as human resources or payroll applications. Attendance Enterprise supports both proprietary CSV (comma separated values) formats and open standard XML (extensible markup language) formats for its imports and exports.

Database Layer

The database component consists of data access services that employ ADO (Active Data Objects) for communication between the application and the database. Attendance Enterprise supports the Microsoft SQL Server (7 or 2000) database.
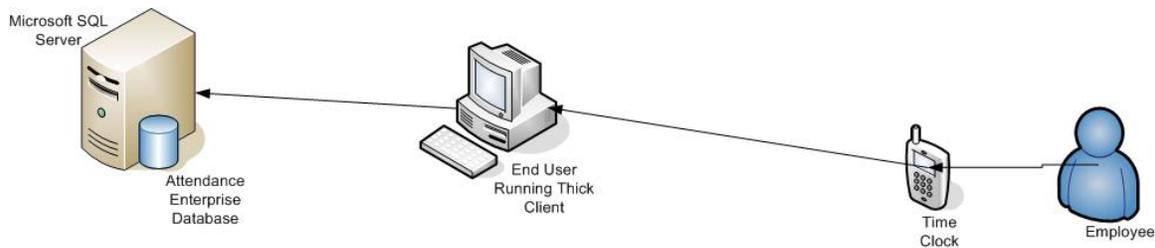
Attendance Enterprise Processing View

Attendance Enterprise maintains current and historical employee data. Historical data includes employee transactions, exceptions, incidents, and so on for time periods prior to the previous pay period. It consists of data that has already been posted to payroll, reflecting hour and dollar totals and attendance performance information that cannot be altered. Historical data is stored in calculated form; the results of mathematical calculations on raw transactions such as punches and transfers are maintained as permanent record. The rules used at the time of the calculation are preserved in the form of their results on the employee data.

An employee's current data is calculated whenever it is accessed and presented to the user. For the current pay period and the previous pay period before posting, only raw data is stored in the database. Calculations for rounding; lunch deductions; premium, overtime, and other pay enhancements; shift, daily, and period totals; and so on occur whenever a time card is accessed or a report produced. Information is always fresh and reflects any updates to parameter or incident rules, adapting instantly to changes in company policies. This results in processing loads that can be distributed in several ways to increase system performance.

Thick Client Processing

In a thick client installation, all Attendance Enterprise components are installed on a single computer. All of the data, business rules, and performance management calculations occur on a single computer. This computer also renders the user interface. For small businesses, the client computer may also host the database. Performance on this computer can be affected when processor-intensive activities occur, such as recomputes or large current period reports.


Thin Client Processing

A thick client installation uses various settings in Attendance Enterprise to offload processing. In this case, an application server performs time card calculations, automated task processing, and other business rules and performance management functions. The client computer, at which the user works, renders the user interface. The database also resides on a separate database server.
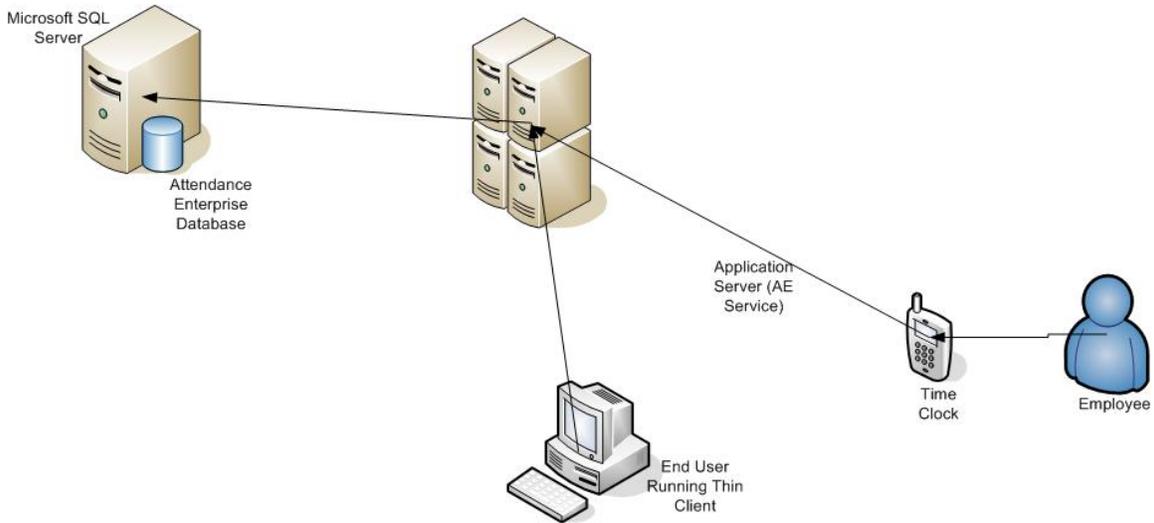
Web Component Processing

Attendance Enterprise web components—Employee Self Service, Manager Self Service, and Kiosk—require an IIS server to maintain the web site that provides user access to Attendance Enterprise. This configuration uses an IIS server, application server, and database server to distribute processing.
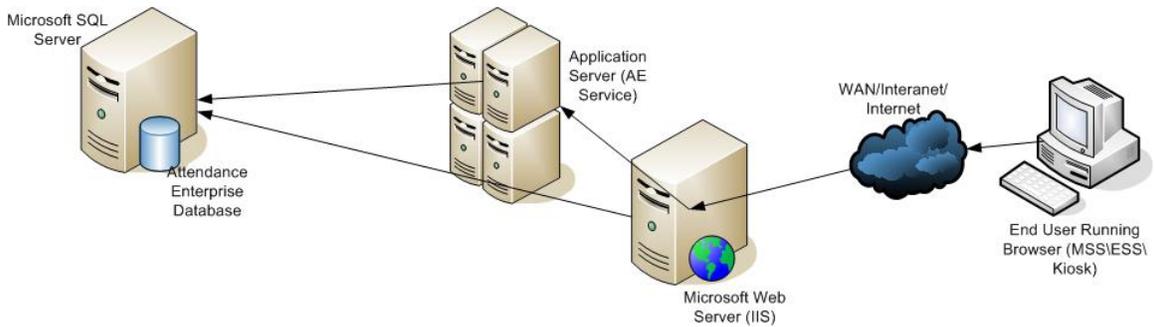
Attendance Enterprise Security

Attendance Enterprise provides security at two levels: application security and database security.

Application Security

Application security within Attendance Enterprise associates specific user rights with Attendance Enterprise user groups. User rights control the functions a user can perform and the employees a user can see within Attendance Enterprise.

Every Attendance Enterprise user account belongs to a specific user group and inherits the group's rights. Attendance Enterprise also supports sub-groups that can further restrict access within a group.

Microsoft SQL Server Security

In addition, Attendance Enterprise employs Microsoft SQL Server security to restrict database access. Attendance Enterprise accesses its database using an application role so that Attendance Enterpriser users do not need database user accounts. Application roles allow the application, rather than SQL Server, to take over the responsibility of user authentication.

Standard roles apply database permissions to member users. Application roles are different than standard roles in the following significant ways:

- Application roles contain no members.

  Microsoft Windows NT 4.0 or Windows 2000 groups, users, and roles cannot be added to application roles; the permissions of the application role are gained when the application role is activated through a specific application. A user's association with an application role is due to his ability to run an application that activates the role, rather than his being a member of the role.

- Application roles bypass standard permissions.

  When an application role is activated for a connection by the application, the connection permanently loses all permissions applied to the login, user account, or other groups or database roles in all databases for the duration of the connection. The connection gains the permissions associated with the application role for the database in which the application role exists. The permissions the user gained from the application role remain in effect until the connection logs out of an instance of SQL Server.

Summary

The Attendance Enterprise architecture embodies a coherent and consistent strategy that adheres to Microsoft® architecture principles. The product implements Microsoft standards for operator authentication, database management, application installation, content providers, browser clients and inter-process communications. Attendance Enterprise components address an organization's business needs while maintaining the highest standard of performance and security.