

# Ensim Unify

The Industry's First  
Multi-Service Hosting System

A Technical White Paper



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# 1 Introduction

In today's fast-changing global economy, service providers who deliver software as services (SaaS) to small office/ home office (SOHOs) and small-to-medium-size businesses (SMBs) are continuously challenged. Despite scarce resources, they must adapt to transforming business models and rising customer expectations. Satisfying these demands requires a service-delivery infrastructure that both conserves resources and enables service providers to quickly respond to customer needs.

To create such an infrastructure, service providers turn to Ensim Unify, the leading provisioning platform for automating the creation, activation, and configuration of hosted services.

Co-developed with Microsoft since 2003, Ensim Unify has more than a dozen pre-built Application Managers for the most popular hosted applications. This enables service providers to launch new hosted offerings to both customers and resellers quickly. Further, the platform is extensible. Its powerful SDK (software development kit) makes it possible to create and deploy new Application Managers for additional hosted services as needed.

Ensim Unify is a single solution for provisioning, managing, and metering multiple hosted services as well as a single point of integration with business systems. It makes rolling out new generations of hosted services economical, and it enables service providers to create an agile service-delivery infrastructure that meets today's ongoing hosting challenges.

## 2 Emerging business challenges for the hosting industry

Until recently, UNIX Web site hosting and basic email services provided nearly all of the revenue for service providers. Now, with increased competition driving down prices, these services have become commodities. Service providers are looking to launch new applications that can provide a steady stream of revenue today and in the future, through the integration of add-ons.

With these facts in mind, service providers now realize that in order to succeed they need to have a service-delivery solution that allows them to:

- **Bring new services to market economically.** Until now, this required investing in a brand-new infrastructure specifically designed to deliver a single service. Because that infrastructure was service-specific, lengthy development and deployment cycles were needed to build and integrate it with existing business systems. The end result was delayed introduction of new services, high deployment costs, and significantly greater development risks.
- **Support multi-tier distribution efficiently.** Building a loyal distribution channel requires giving resellers control over service definitions and the ability to private-label each type of distribution channel. Additionally, resellers need easy-to-use administration tools—for provisioning, monitoring, metering, and self-management—to focus on marketing, selling, and supporting core competencies. Large distributors may also want to support distribution channels of their own.
- **Automate multi-service delivery and management.** As they begin to offer new services, hosting providers need common processes for efficiently administering all hosted services.
- **Offer customer-centric plans and seamless upgrades.** To offer value-add service bundles that accurately reflect customer preferences, service providers need to combine and provision multiple sets of related services. Further, they must be able to transparently upgrade existing customer services, or activate new services, without interrupting existing service delivery.
- **Provide comprehensive, role-based self-management at all levels.** This requires providing self-management interfaces that give all users access to the right set of capabilities for their specific role.

### 3 Ensim Unify solution overview

Ensim Unify is the hosting industry's leading multi-service hosting system, comprised of powerful provisioning software and a portfolio of Application Managers for hosted services such as:

- Unified communications
  - Hosted Exchange
  - Windows SharePoint Services
  - Microsoft Live Communications Server
  - BlackBerry Enterprise Server
  - Siemens OpenScape
  - BroadSoft's VoIP solution
- Web hosting
  - Windows Web hosting with ASP.NET
  - Microsoft SQL 2005 database hosting

The Ensim Unify platform significantly improves hosting efficiency by providing common, reusable capabilities for service resource management, provisioning, monitoring, metering, self-management, and authentication, as well as a single point of integration with existing business systems. Additionally, by using Ensim's pre-developed Application Managers, service providers avoid the high costs of bringing new services to market.

Combining proven hosting automation processes with industry best-practices and leading Microsoft .NET technologies—Active Directory, Windows Server, Visual Studio .NET, and others—Ensim Unify offers:

- Out-of-the-box support for a range of hosted services
- A common set of processes for managing all hosted services and related resources as well as a single point of integration with business systems
- Retail distribution support and the ability to sell bulk resources through multi-tier wholesale channels
- The flexibility to combine and provision bulk resources into customer-centric plans
- The ability to offer self-management to all customers

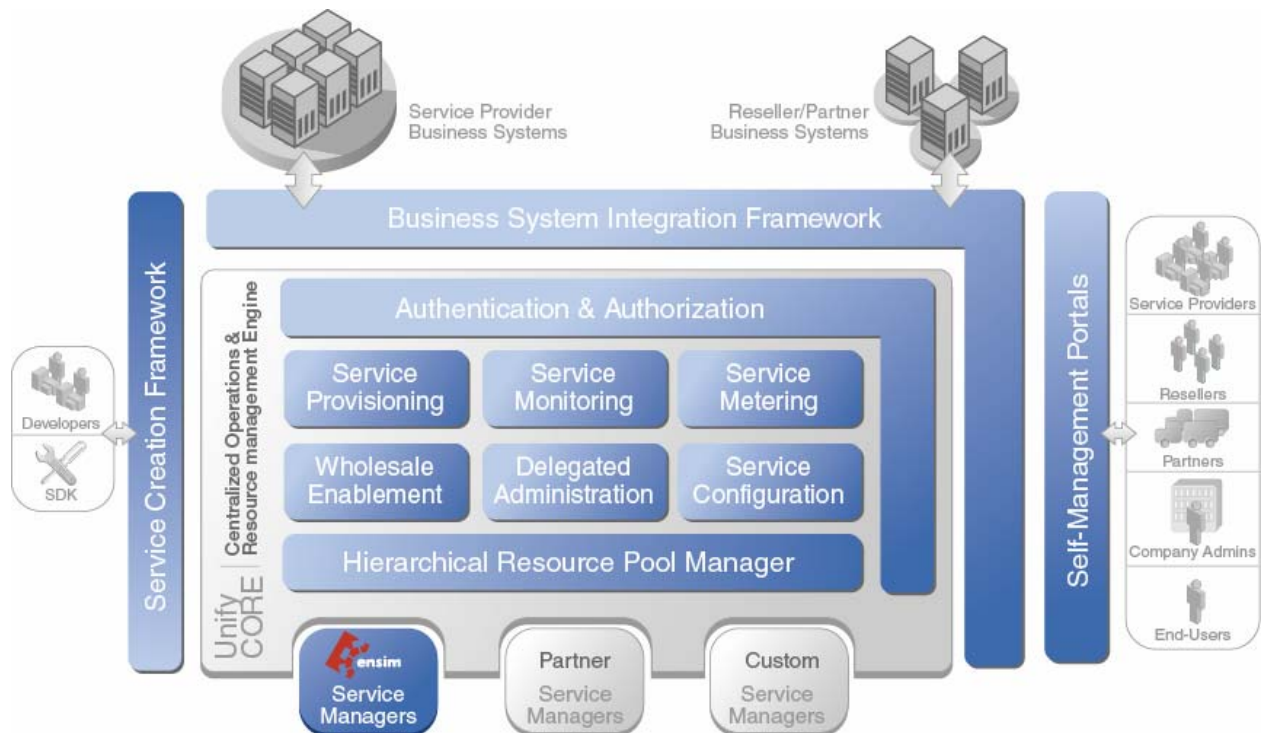
### 4 Ensim Unify - core capabilities

Ensim Unify offers a fundamental change in the way hosted services are developed and delivered. By carefully separating service-specific from service-independent functionality, Ensim Unify provides a single point of control for hosted services.

Service-independent functionality, such as user authentication, relies on fully functional components incorporated into the platform and shared by all Application Managers. Service-specific functionality, such as provisioning Hosted Exchange messaging plans, is provided by the hosted Application Manager.

Functionality with both service-specific and service-independent aspects is coordinated between the platform and the Application Manager. For instance, error reports and logs created within the individual hosted service use a common format that is service-independent.

Separating service-independent and service-dependent functionality allows service providers to efficiently manage multiple services. At the same time, it delivers a consistent service look-and-feel, along with user and programmatic interfaces for distributors and retail customers.



**Figure 1.** Ensim Unify overview

As shown here, Ensim Unify's service-independent components offer robust capabilities for:

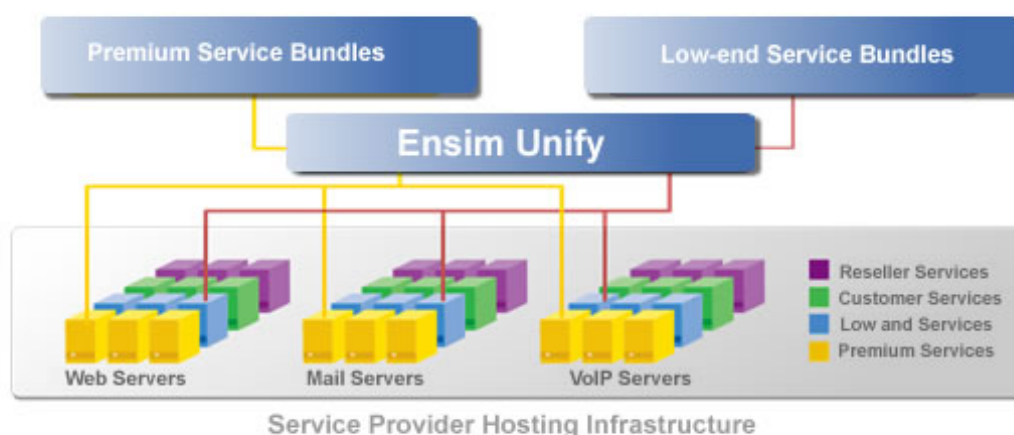
- Hierarchical resource allocation
- Unified provisioning
- Unified monitoring
- Unified metering
- Authentication and authorization
- Self-management through browser-based interfaces
- Comprehensive APIs to integrate with the Web Services interface

## 4.1 Virtual resource pools

Ensim Unify allows service providers and distributors to easily classify one or more servers running the same or distinct services into virtual resource pools. This is a very powerful and efficient way to manage resources.

Virtual resource pools allow a set of servers to be referenced by a single identifier. For example, groups of servers can be classified as:

- **Premium Pool.** Servers for high-end shared hosting (high SLA)
- **Entry-level Pool.** Servers for low-end shared hosting
- **[Distributor name] Pool.** Servers dedicated for a large distributor (by customer type)
- **Dallas Data Center Pool or California Data Center Pool.** Servers for different data centers (by geographic location)



**Figure 2.** Virtual Resource Pools

Virtual resource pools can be associated with different service plans. For instance, a Premium Hosting Plan can be associated with the Premium Pool and a Basic Hosting Plan with the Entry-level Pool. Ensim Unify ensures that servers from the right pool are selected to provision the appropriate service plans. With virtual resource pools, service providers and distributors can easily allocate resources for different service plans, support various levels of quality-of-service guarantees, and more.

## 4.2 Unified service provisioning

Ensim Unify offers advanced capabilities for provisioning hosted services. Service providers and resellers can easily provision a full range of service plans, from simple plans, which include a single hosted service, to complex bundles that combine several hosted services.

With Ensim Unify, service providers can automate the numerous back-office and business processes involved in configuring and activating a hosted service. **Each service plan, whether it consists of a single service or multiple services, is provisioned in a single transaction across servers.** The provisioning engine supports real-time resource checks, transactional state maintenance, queue management, rollback, and comprehensive audit trail capture, ensuring complete transaction integrity. The provisioning functions interact with the resource management component to perform real-time resource checks.

Robust rollback capabilities, including single and multi-step rollbacks, provide disaster recovery for the most complex scenarios. And detailed audit trails reduce resolution time when errors are encountered.

Additionally, Ensim Unify makes it simple for service providers to start customers on entry-level plans that can easily be upgraded to higher value plans. The integrated platform allows service providers to seamlessly incorporate value-add features as needed, within a customer's existing service plan.

### **4.3 Unified service metering and monitoring**

The unified service monitoring component provides capabilities for tracking the availability of servers running the supported services, as well as actual resource usage against allocated resources for all system users.

The Ensim Unify service metering component lets service providers and their resellers capture usage data across services, thus lowering their risk of revenue losses or billing inaccuracies. Customers can also track usage to reconcile billing statements.

### **4.4 Secure, multi-tier, role-based access**

Every hosted service requires at least two levels of administrative control: one that gives the service provider administrative user-sufficient privileges to set up and administer the service, and one that gives service end-users enough privileges to manage their service day-to-day. This two-tier control is all that's needed to support service providers with a direct sales approach.

However, administrative control and security get more complicated when service resources are resold. On one hand, resellers and distributors need intermediate privileges that let them provision, monitor, and meter services without exceeding the access and/or resource capacity prescribed by their service provider. Moreover, distributors must not be allowed to carry out operations that belong only in the purview of the service provider. On the other hand, service providers must have a way to keep track of the resources as well as limits and usage associated with each distributor.

To ensure that each level of administrator receives the appropriate level of control, Ensim Unify leverages a combination of Microsoft Active Directory (implementing the role hierarchy in Microsoft's *Prescriptive Architecture Guide*) and an industrial-strength database to authenticate and authorize all users for their specific role and access.

## 4.5 Authentication

Single sign-on authentication using logins and passwords is available for all services supported by the Ensim Unify platform. Authentication is the security process of verifying user credentials before granting system access. Whether users log in through the graphical user interface or the Web Services interface, these credentials are passed to Microsoft Active Directory for authentication before the transaction is processed.

## 4.6 Authorization

Ensim-specific schemas are used in combination with the Active Directory to provide role-based access to Ensim Unify. Each Ensim Unify user is associated with one or more of the four distinct user roles supported:

- **Service provider administrators** who own the Ensim Unify platform
- **Reseller administrators** who may be organized into a multi-level hierarchy
- **Company administrators** who oversee hosted services received from a service provider or distributor for a small business
- **Service end-users** who are the final consumers of any hosted service

Authorization works in conjunction with authentication, automatically assigning the appropriate administrative functionality to each user according to their role. In addition, every user action is individually authorized before being allowed to proceed. For instance, consider a reseller with a server running Microsoft IIS 6.0 and FTP who wants to create a virtual domain for an end-user. If the Web site is created using Ensim Unify, the reseller and end user are assured that:

- Only the reseller administrator, company administrator, and service end-user will be able to modify the Web site
- Capacity limits for the IIS and FTP service components will be enforced
- Company administrators and service end-users have different privileges for modifying the site and these privileges are enforced

## 4.7 Multi-tier self-management interfaces

Ensim Unify provides support for single, role-based self-management interfaces for reseller and company administrators, as well as service end-users. Users can access all the bulk resources or hosted services provisioned to them through a single interface. As new resources or services are added, they become accessible through the same interface. This allows service providers, resellers, and even company administrators to delegate all common service-management tasks to the retail customers and service end-users they manage.

With Ensim Unify, every service provider, reseller, company administrator, and service end-user gets management functionality appropriate for his or her role. The service provider and reseller administrative interfaces provide comprehensive resource management, provisioning, monitoring, metering, and other capabilities. The company administrator interface provides capabilities for managing end-user set up and support. And the service end-user interface exposes capabilities appropriate for managing personal accounts and service settings. In addition, each interface can be branded to reflect the service provider's, reseller's, or company's corporate identity.

## 4.8 Integration through Web Services APIs

A set of APIs provides service providers and resellers with programmatic access to all platform capabilities. Leveraging these interfaces, service providers can use standard Web Services APIs to easily integrate Ensim Unify with complex and heterogeneous IT infrastructures. Programmatic access allows them to fully automate end-to-end processes, such as flow-through provisioning, service billing, and others.

Because access to Ensim Unify Web Services is fully authenticated and authorized, these programmatic interfaces can be safely extended to distributors over the Internet. Service providers can now deliver the operational efficiencies of programmatic interfaces to their distributors too. Delivered as plug-ins for Microsoft Visual Studio .NET, these Web Services interfaces can be used with standard development tools.

# 5 Enterprise tools

Despite the importance of the underlying platform, Ensim has built a series of tools that benefit enterprises using hosted services. These tools were created to enhance the functionality and ease of migration to a hosted service.

## 5.1 Provisioning and configuration of mobile devices for Exchange access

Automated provisioning enables users to set up mobile devices without having to manually configure them. For Windows mobile 5.0-based devices, automated provisioning involves creating a provisioning XML file, which contains configuration information, and then sending that file to the device. The following delivery methods are supported:

- **USB:** The configuration file is transferred to the device when the device is connected to a desktop computer through a USB port.
- **Over-the-air (OTA):** The configuration file is sent to the device through an SMS message. To use OTA, service providers need to implement an SMS gateway interface module based on Ensim's database logs, and they need to obtain additional licenses for OTA.
- **SMS:** The link to the configuration file is sent to the device as an SMS message.
- **Email:** The configuration file is sent to the device as an email message.

## 5.2 Client configuration

For customers who already use Outlook internally, a reconfiguration to hosted servers is necessary once they decide to outsource their messaging solution. With Ensim, employees can easily log in to their Web management portal and download a small .exe file. This file automatically reconfigures their email client in less than a minute, allowing for instant productivity gains.

## 5.3 Ensim Unify Trial Kit

The Ensim Unify Trial Kit is an application that service providers can use to deploy a registration portal where customers can sign up for trial accounts for Microsoft Hosted Exchange and Microsoft Windows SharePoint Services. The trial kit creates and manages trial accounts and links them to the Ensim Unify setup. By default, the trial accounts are valid for 30 days. Service providers can customize and internationalize the Ensim Unify Trial Kit application as needed.

The Trial Kit application consists of the following modules:

### **Registration module**

This is the portal front-end for online registration. The registration module accepts trial account requests from the registration pages and stores the data in the database.

### **Trial Kit database**

This is the database that holds trial account information. It stores all trial account data as well as configuration information that is used to communicate with the Ensim Unify system.

### **Scheduler module**

This is the back-end module which manages Ensim Unify accounts. The scheduler module runs periodically to retrieve trial account data from the database, and it processes this data to create, deactivate, or delete trial accounts in Ensim Unify.

### **Reporting module**

The reporting module generates trial account usage reports. The report generator module runs periodically to retrieve trial account data from the database, and it generates reports on the status of the current, pending, and expired trial accounts.

## 6 Extensibility through the Ensim Unify Application Manager SDK

Using the Application Manager SDK (software development kit), Ensim Unify gives service providers and third-party independent software vendors (ISVs) the ability to plug in Application Manager modules to control the provisioning of new hosted services. The SDK can be used to create an Ensim Unify Application Manager for any application so that it can use all the facilities provided by the Ensim Unify platform. These include provisioning, resource management, metering, health monitoring, and other management and administration tasks for the application.

The Application Manager SDK provides a flexible and extensible framework to quickly enable applications for service delivery. Using the Ensim Unify platform and Application Manager SDK for delivering a service dramatically shrinks the new service development and deployment cycle, allowing service providers to quickly add high-value services. Further the Application Manager SDK provides a set of libraries for most common management tasks related to the file system, databases, Microsoft Windows registry settings, and so on. These libraries hide the complexity of generic programming APIs and publish an easy-to-use interface for application developers.

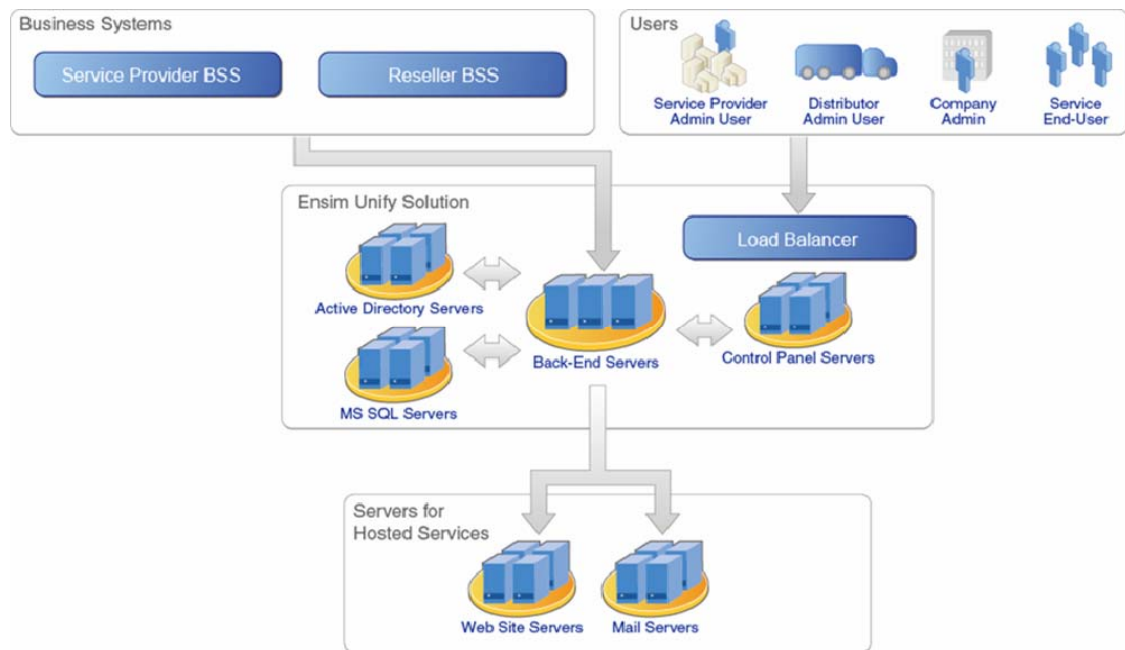
## 7 Enterprise-class operational support

Ensim Unify provides robust scalability, availability, ease of maintenance, and management to meet the operational requirements of today's hosting industry.

### 7.1 Availability

Ensim Unify avoids a single point of failure by supporting redundant and highly available deployment configurations. It is recommended that the Ensim Unify platform be deployed on four sets of physical server clusters that host separate functionalities as illustrated below.

- *Control-panel server cluster*: Web servers that provide browser-based, self-management interfaces for all users.
- *Back-end server cluster*: Servers that host Microsoft Provisioning Software (MPS) interfaces and provide all application business logic. This cluster also interacts with two special-purpose server clusters: Active Directory and SQL.
- *Active Directory server cluster* and *SQL server cluster*. These implement centralized authentication, authorization, and database services for applications, and they store all read/write data.
- *Hosted services server cluster*. This cluster provides service-specific functionality.



**Figure 3.** Deployment Architecture Overview

These load-balanced server clusters ensure that no single server, if taken offline, would render an application unusable. Unresponsive servers are simply removed from a load-balanced server cluster without disrupting the operations of the remaining servers. Here's more detail on how each server cluster contributes to availability:

- The control-panel server cluster can be accessed through one or more load-balancers. If a single server goes down, control-panel requests are automatically routed to other servers in that cluster.
- In the back-end server cluster, if a single server goes down, distributed application requests are automatically routed to other servers in that cluster.
- Active Directory and SQL business data stores are deployed in high-availability configurations, as recommended by Microsoft. If a server controlling the data store fails for any reason, the application automatically uses standby servers.
- Server clusters for hosted services can be set up following software-vendor-recommended high-availability deployment guidelines.

## 7.2 Scalability

Ensim Unify delivers high performance even when one or more load factors are increased, such as the number of users, the amount of data processed, or the number of transactions. The platform easily scales up and scales out without significant infrastructure change.

To operate efficiently (scale up) under heavy loads, Ensim Unify implements software best practices such as asynchronous operations, throughput demand, and data caching to accelerate response times. Additionally, where possible, Ensim Unify avoids unnecessary holding states and resource contention. Further, the platform leverages highly scalable technology components, such as Microsoft SQL, Active Directory, and Provisioning Server.

### 7.3 Maintainability and manageability

Ensim Unify is architected for easy deployments, upgrades, monitoring, troubleshooting, and application enhancements. Its distributed architecture, code reusability, and coding efficiency facilitate efficient software maintenance. This ensures that Ensim can continuously enhance the Unify platform and maintain a cutting-edge offering.

In addition, Ensim Unify provides several key capabilities to help manage the service delivery environment, including:

- Basic system-status monitoring for servers running the Ensim Unify platform software
- Detailed audit trails for all user actions performed on the Ensim Unify platform
- Remote stop and start for servers running the Ensim Unify platform software

## 8 Component-based, multi-tier software architecture

Robust software architecture is the key to supporting a large-scale hosting business. Ensim Unify platform software is architected as a multi-layered application that separates user interface, business logic, data logic, and database components within the software. The four layers—presentation, business, data, and integration—are shown in the following diagram. In accordance with the Microsoft .NET framework, the Ensim Unify architecture also supports an open-standards integration layer for communicating with other applications and service-specific software for hosted services.

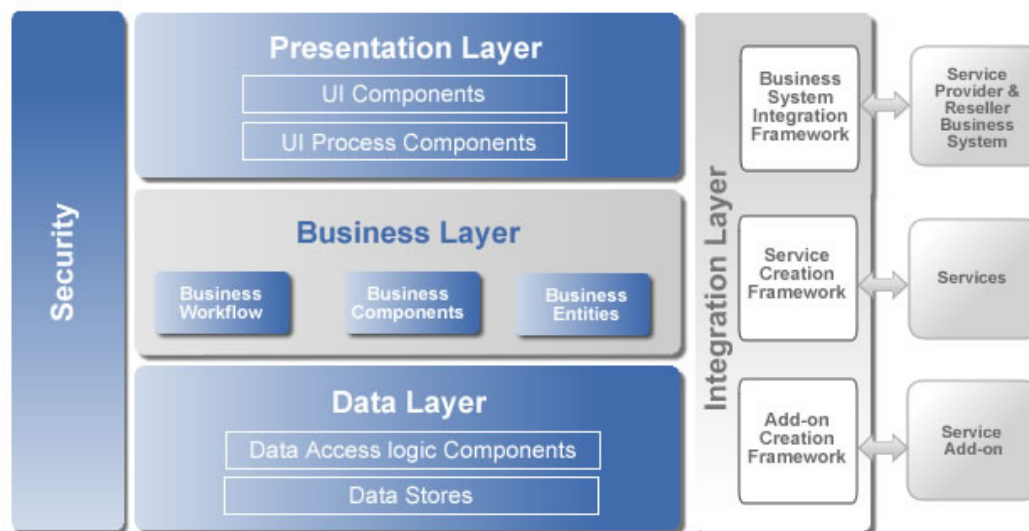


Figure 4. Software Architecture Overview

## 8.1 Presentation layer

Ensim Unify's presentation layer relies on user-interface and user-process components to manage browser-based user interactions with the platform. User-process components help orchestrate predictable user interactions with the business layer and provide a single user interaction "engine" for multiple user interfaces.

User-interface components provide a way for all system users—service providers, resellers, company administrators, and service end-users—to interact with Ensim Unify. Implemented using Microsoft ASP.NET pages and controls, user-interface components are designed to be stateless.

## 8.2 Business layer

The core of the Ensim Unify software's functionality is delivered through business components, business entities, and business workflows:

- **Business components** essentially implement business logic—the rules and tasks that drive business processes, such as resource management, provisioning, monitoring, metering, and others—regardless of whether that logic consists of a single step or an orchestrated workflow.
- **Business entities**, such as provisioning templates, resellers, site users, and others are implemented as Microsoft .NET object classes, making them easy to pass between database and user-interface layers.
- **Business workflows** define and coordinate long-running, multi-step business processes to ensure application integrity.

### 8.3 Data layer

The Ensim Unify software abstracts the logic necessary for decentralizing data-access functionality, which makes it easier to configure and maintain the platform. In addition, business components often use this layer to access the functionality provided through Application Managers:

- Data-access logic components encapsulate the logic used to access, query, and update the data stores
- Scalable and reliable databases—Active Directory and MS SQL—are used as data stores

### 8.4 Integration layer

Ensim Unify's open architecture offers WES 3.0 compliant Web Services which can be used to integrate software for hosted services.

- **Business Systems Integration Framework** – Used to expose several APIs for integration of third-party applications. All APIs are exposed at the control-panel server level. The Ensim Unify user interfaces even perform all provisioning actions using the API through the .NET environment.
- **Service Creation Framework** – Used to manage the semantics of communicating with Application Managers. These .NET interfaces allow the new services to seamlessly inherit all existing service-independent capabilities of the platform and provide a consistent end-user experience. Delivered as plug-ins for Microsoft Visual Studio .NET, these interfaces come with extensive documentation and sample code to guide service providers in designing APIs that further customize Ensim Unify software.
- **Add-on Creation Framework** – Provides the ability to enable provisioning and billing for add-on applications for existing services. Through basic platform hooks and simple scripting, add-on applications can be provisioned along with services to create a complete hosted solution.

## 9 Ensim and Microsoft

Ensim is the first provider in the industry to become a Microsoft Gold Certified Partner, and has enjoyed a long relationship with Microsoft.

Ensim Unify currently supports all the latest Microsoft technology (HMC 3.5 and WBH 4.0) and is a member of Microsoft's partner program, gaining early access to bits and roadmap data. This close collaboration allows Ensim to support new releases of the Microsoft hosted solutions faster than other partners.

Ensim's partnership with Microsoft allows customers to more easily launch the complete suite of Windows hosted services while enabling the central delivery of additional high-value applications such as VoIP, Unified Messaging, and mobility services.

For more information on Ensim Unify please visit: <http://www.ensim.com//unify/>

### 9.1 Contact Ensim

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