

## Overview:

Built exclusively for chiropractors, this software product is a fully-integrated, cloud-based practice management software with modules for scheduling, reporting, document management, and billing. Some of the key features of the product include the following:

- 100% web-based ; saves efforts for installation, updation or maintenance
- Access to practice data from any web connected device.
- PC, Mac and Tablet compatibility
- Simplified scheduling, reporting and billing modules
- Comprehensive documentation solution
- Email and Text appointment reminders
- Outmost ease in creating a compliant SOAP note and claim in seconds
- Customized care plans
- Free electronic claims with auto EOB posting.
- ICD-10 compliant
- Secure record sharing
- Daily automated backups
- Customizable reporting

## Client details:

**Name:** Confidential | **Type:** Healthcare IT | **Location:** USA

## Technologies:

Microsoft Azure, ASP.NET MVC 4.0, C# 4.0, EF 6.0, Kendo UI 2013.3.1324, HTML 5, jQuery, CSS3, Bootstrap v2.3.2

## **Project Description:**

The intent while developing the software was to build a system which is comprehensive, yet simple. It reflects in the manner in which the product took shape- easy to learn and use , highly effective. The interface is quite intuitive and mirrors the workflows of a chiropractic setup extremely well. Major functions like scheduling, record management, documentation and billing get handled with outmost ease. Finally, use of cloud based technology, compatibility and emphasis on security rendered high degree of salability to the product. Following captures the salient features offered to enable execution of the primary tasks:

### **Scheduling**

This module enables its users to have complete control over a patient's flow though a setup. No-shows get reduced considerably through automated emails and text appointment reminders. Main features:

- Scheduling single or recurring appointments with ease
- Ability to access a user's schedule anytime and from anywhere
- Define specific appointment types using time blocks and color coding
- Free automated appointment reminders
- 2-way, real-time text reminders for instant appointment confirmations
- Easily track and follow-up on missed, cancelled and no-show appointments
- Track new patient referrals
- Support for multiple facilities, providers and treatment rooms

### **Electronic Health Record**

Users of this product are rendered with the capability to manage the records of their patients with outmost flexibility and security. With all the comprising modules integrated seamlessly, uploading and managing documents and image files of patients is done effortlessly; with provision to take secure automated backups.

## Documentation

This module has been designed keeping in mind the gaps which contribute to endless hours of effort getting wasted on documentation. Reports generated are clear, concise and meet the high demands of precision of the insurance companies. Overall this drives up the percentage of accepted claims and reimbursements. Infact the system allows creation of detailed and compliant SOAP (subjective, objective, assessment, and plan) notes and raise claims is a matter of seconds. Main features:

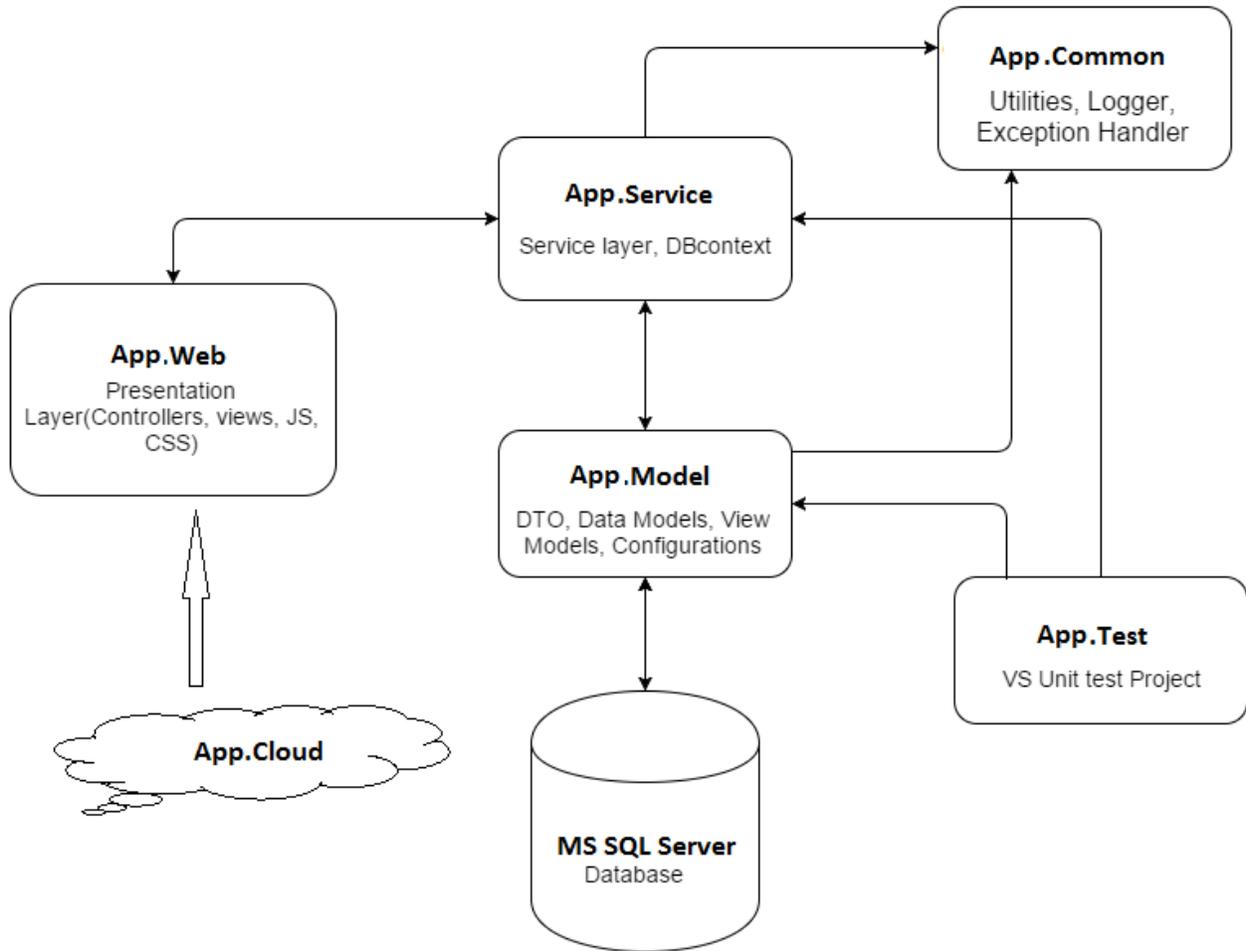
- Maximize reimbursements with compliant notes and reports
- Paperless office, Eliminate the need for paper charts, folders & filing cabinets
- Create detailed SOAP notes in just seconds using our push technology
- Easily create a variety of outcomes assessments with automated scoring
- Create customized care plans with ease
- Securely share records in seconds with other providers, attorneys or patients

## Billing

Claims get auto-generated with every office note and can be printed locally or sent electronically to a clearinghouse in a matter of seconds. Main features:

- Auto-post payments to the proper accounts with electronic EOBs to save time
- Set up multiple cases and account types for each patient
- Check the status of your claims quickly and easily
- Generate billing statements and aging reports
- Quick and accurate payment posting
- Setup cash plans for uninsured patients
- Track the health of your practice with a variety of financial reports.

## Architecture:



## Screenshots:



**1. Login Screen:** All types of users can login here: Physician or Staff or Practice Admin or an Emulator.

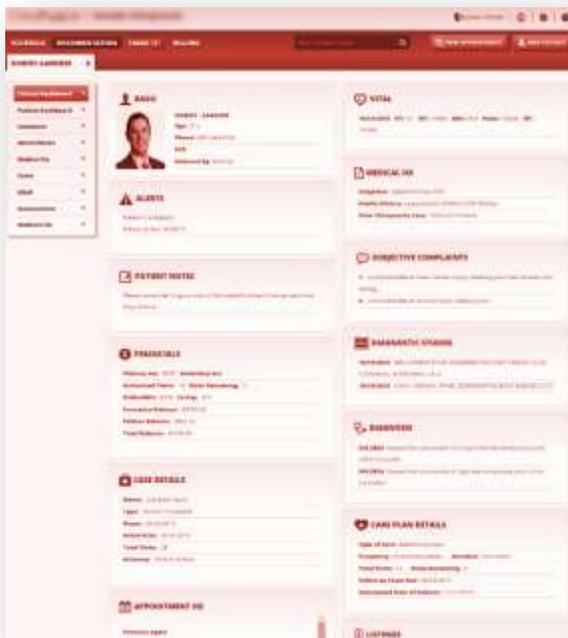
Security measures available ensure sending of Login credentials to the registered email ids of users to login for the first time into the application. They are prompted to change their passwords after the first login.



**2. Scheduler Screen:** Physicians use this page to schedule their patients' appointments. This is a very light weight Kendo scheduler which supports numerous features resulting in saving a lot of time.



**3. Appointment Reminder Screen:** Patients are automatically sent appointment reminders after scheduling to reduce cases of no-shows. Users can select a two-way text reminder add-on, to prompt patients to confirm or cancel their appointments by replying to it. Confirmations and cancellations are automatically shown in the calendar as a red or green icon next to the patient.



**4. Patient Clinical Dashboard:** A user can check a Patient's details in a single page like patient-alerts, notes, case details, financials, appointment history, subjective complaints, diagnosis, care plan details etc. Each section header is linked to its respective module. For e.g. clicking on Alerts header takes a user to the Alerts and Notes page.



**5. Patient Dashboard:** This is the screen where a Patient's basic demographics and related information is present. We have one settings tab also, where patient specific information can be set.



**6. Insurance Screen:** This is the page where a patient's primary, secondary and other insurance details are listed. There is a tab under the Insurance section where a user can create a case for a patient and attach any available insurance details/docs .The Authorizations tab is for documenting authorization information of a patient.



**7. Alerts and Notes Screen:** It stores the alerts and notes of patients. Users of the application can enable or disable a patient's saved alerts on need. The same then reflects in the corresponding patient's Clinical Dashboard.



**8. Medical History Screen:** This is where a Patient's Medical History is documented. It has three sub sections - Vitals, Lifestyle and Medical History. The Vitals section lists a patient's vitals like BMI, height, weight etc. Likewise, a user can document Patient's lifestyle and medical history here.



**9. Exam Screen:** This module has details of the various exams that can be performed on a patient and the subsequent findings can be documented for e.g. Patient's HPI (History of present illness), Subjective, Assessment etc. These Exams are DOS (Date of Service) specific or visit specific. A case may have a number of DOSes and each DOS may have different data for a patient.

For a newly created visit, the modules pull patient data automatically from the latest data available. This mechanism is called as Auto-pull forward mechanism which saves the user's time in documenting a Patient's findings. If user is in the middle of documenting any module's data and he needs to switch to some other important task, there is a feature to keep drafts in the application. This allows a user to go back and address their incomplete records later. When a User completes his findings, he can sign it using the "Sign" button available at the top. It generates a Patient's overall report, which in turn gets saved under "Medical Files" section. Modules under "Exam" section are fully customizable. A user can select what all modules he wants to keep under "Exam" and skip the rest.



**10. SOAP Screen:** The screen is more or less similar to that of EXAM and is customizable. A user can select the screens he wants to keep and skip the rest. Objective contains details of sub-exams like Chiro-Analysis, ROM(Range of motion) etc.



**11. Assessment Screen:** In this screen, a Patient's condition is assessed and a score is provided. Users can collect the required data from the patients by getting them to respond to paper-based questionnaires.

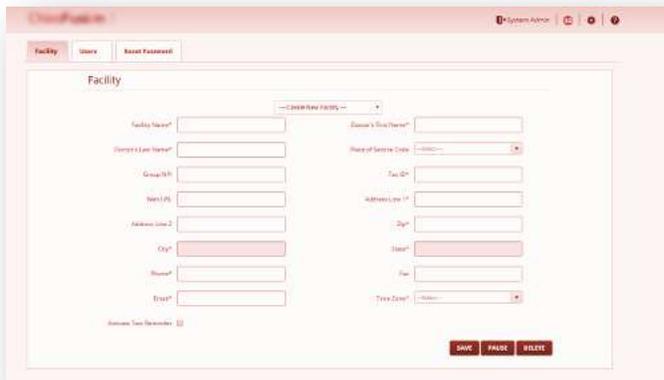


**12. Medical File:** This is where all kinds of patient files are stored. It could be an X-ray document, images etc. Users can select a file category in the Medical file grid and can see a preview of it or can download it. This pertains to the EMR modules available in the application.



13. **Patient Search:** We can search patients via search page as well via global search field. Global search field is present at the top of the screen which a user can use to do a free-text search to search any patient. From a search-result page, a user can directly go to a Patient's dashboard. The search function can be used across a number of fields - phone-number, DOB, first name, last name etc.

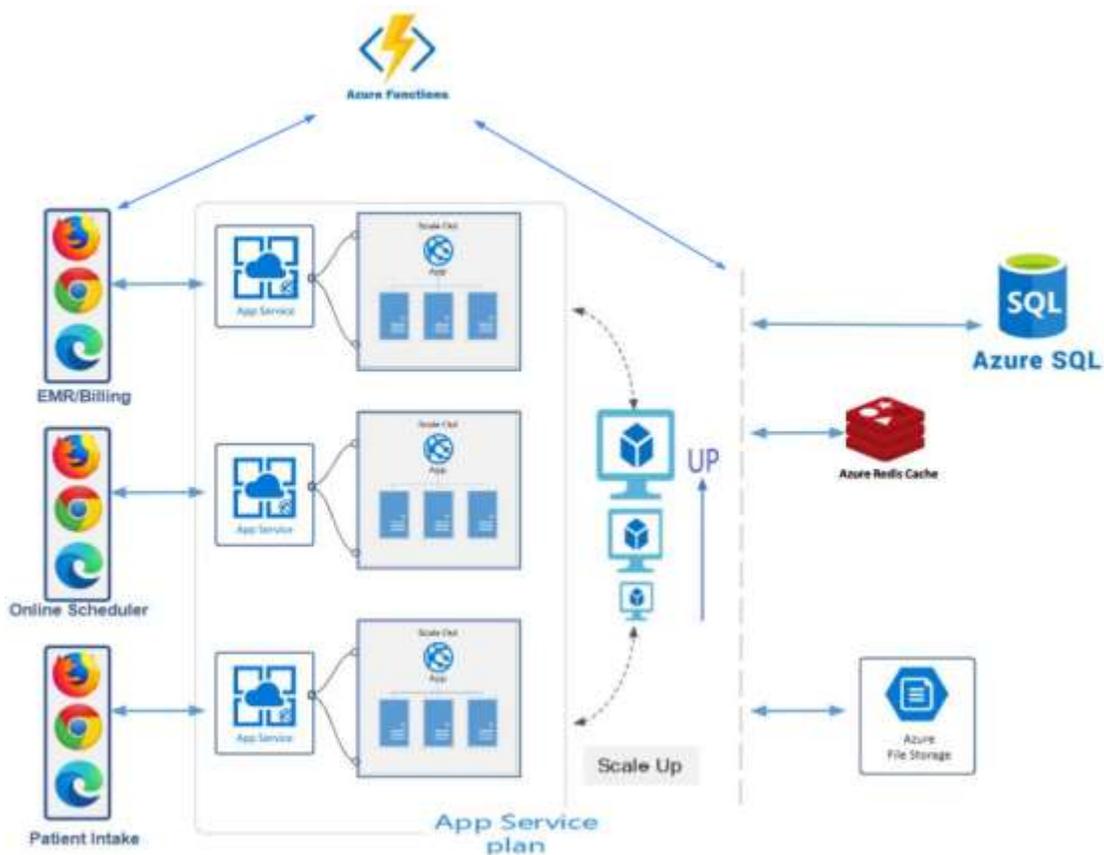
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14. **Admin Module:** Only System Admin has access to this part of the application which is used to create a User's profile, facility, set facility timings, reset password etc.

## Azure Integration Overview:

While Healthcare as an industry is always evolving, some over-arching goals remain constant for the players involved i.e. the need to streamline operations, optimize resource-management and enhance patient care. Leveraging leading-edge technologies allows them to get better at these. As a tech partner to our clients it becomes imperative for us to adept at implementing solutions that put to use these technologies. This case study is an account of how our team was able to utilize Azure's rich ecosystem of services to deliver a custom solution to one of our clients. In particular, the team used Azure App Service, Azure SQL Database, Azure Blob Storage, and Azure Worker Role services.



## **Azure App Service: The Backbone of Healthcare System:**

Azure App Service is a fully managed platform that can be used to build, deploy, and scale web apps. We have employed Azure App Service to power the Electronic Medical Record (EMR) system, Billing, Intake, and Online Scheduling Application. Each of these applications leverages the cloud's features to provide a seamless and dynamic healthcare experience.

## **Azure SQL Database:**

One of the cornerstones of this healthcare management system is the Electronic Medical Records (EMR) and Billing. This application seamlessly integrates with Azure services to provide a robust and efficient patient and claim management system. When a client interacts with the healthcare application, the data retrieval process is powered by the Azure SQL database. This database serves as a secure and reliable repository for all patient-related information. At the heart of our application lies in the Azure SQL Database, where critical medical and billing data get stored.

## **Azure Redis Cache:**

To enhance the performance of the Healthcare application, Azure Redis Cache has been integrated. This cache service significantly reduces the number of database calls, thus boosting application performance. Azure Redis Cache acts as a vital component in reducing latency and enhancing the overall user experience.

## **Azure Blob Storage:**

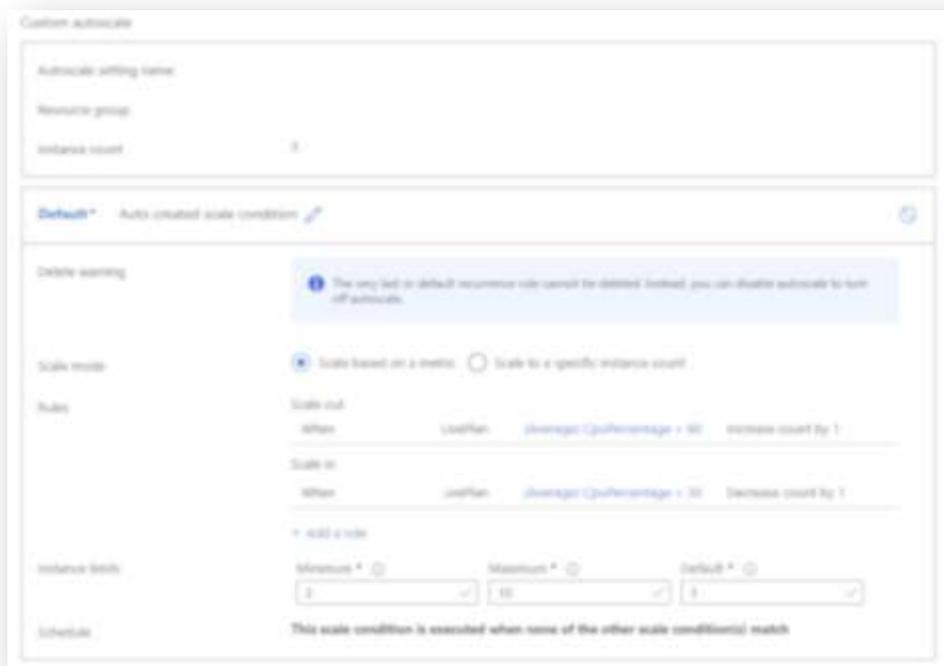
Patient records are a critical component of any healthcare management system. In this case, Azure Blob Storage serves as the repository for these records. All applications within the ecosystem interact with Azure Blob Storage to access patient and practice files. This centralization of data storage ensures that patient records are easily accessible, highly available, and secure.

## Azure Worker Role:

Appointment management is a crucial aspect of healthcare operations. A dedicated worker role service has been implemented to handle this responsibility. This service is responsible for retrieving patient appointment details and sending appointment reminders to patients. Communication with patients is achieved through multiple channels, including text messages via the Twilio API and email. Admin can access their message logs using the Twilio dashboard, improving their engagement with the patient.

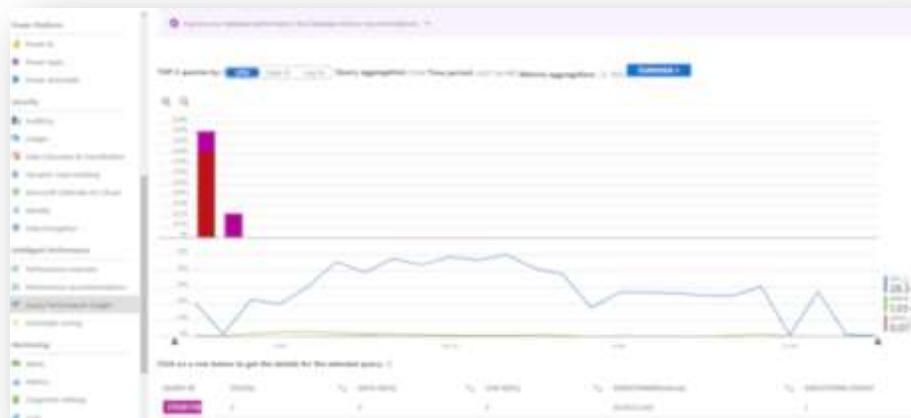
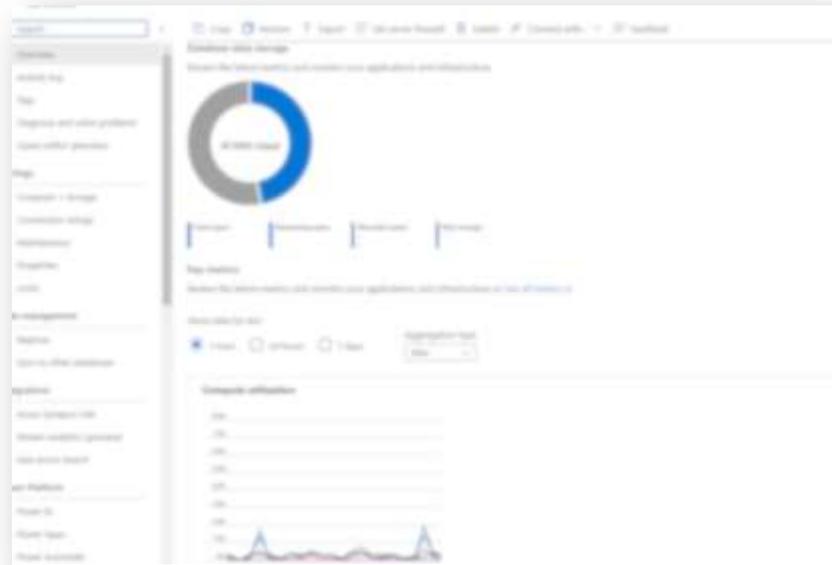
## Resource Optimization and Scalability:

Efficient resource management is vital for the successful operation of healthcare systems. Scale-up and Scale-out are the two workflows used for scaling. Gradually, the team upgraded the CPU usage, memory disk space, custom domains/certificates, staging slots for deployment depending on the size of the user base. A suitable pricing tier is available to meet the exact requirement. All Azure App Services are configured to optimize resource consumption. Rules are implemented to automatically scale the app service instances based on load and CPU consumption. This dynamic scaling ensures that the system can handle varying workloads efficiently.



## Optimize DB performance:

Monitoring the DB activities and optimizing queries in regular intervals is one of the most important jobs of any system that deals with millions of patient healthcare data. The system leverages query metrics and performance tuning services provided by Azure SQL. It is of help while monitoring query-level and host-level metrics together to better understand how resource constraints affect DB performance.



## **Harnessing the Power of Azure Function App:**

Serverless computing has been incorporated into the ecosystem through Azure Function App. This service is instrumental in achieving various functionalities within the online scheduler application. It enables automated processes such as sending email notifications to providers about booked appointments and fetching patient details from APIs. The Serverless architecture not only enhances efficiency but also brings down operational costs.

Our journey into the world of Azure services has been a transformative experience. By integrating Azure App Service, Azure SQL Database, Azure Blob Storage, and Azure Worker Role services into healthcare applications, we have not only successfully optimized our client's operations but also enabled them to deliver superior healthcare services to their patients.