System Architecture (General)

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System Architecture

The Alabama Medicaid Management Information System (AMMIS) system includes multi-payer and improved benefit plan processing, as well as a state-of-the-art N-Tier architecture. The system is a highly sophisticated, feature-rich system centered on a strong, Medicaid-specific relational data model. It divides the application into components so that they process on different networked computers. This design and supporting architecture delivers enhanced flexibility, scalability, and reliability. The AMMIS is composed of different software components which are loosely coupled and arranged in various software and architectural patterns to enable ease of use, development, and maintainability. The core components include the AMMIS batch processing which was developed in the C programming language executing in a UNIX environment, and an N-tier web-based user interface written primarily in C#, utilizing Microsoft ASP.NET. The AMMIS data resides in an Oracle database. There are many other critical software components for AMMIS, involving letter generation, ad-hoc reports, and optical character recognition, electronic storage of paper reports and forms, and Electronic Data Interchange (EDI).

At a high level, AMMIS is comprised of a Graphical User Interface (GUI) and business entities that interact with a robust Medicaid specific data store, the AMMIS components, and any integrated third party products. As shown in Figure 1, this example of the AMMIS system is a high scaleable transaction system enabling both real-time and batch processing of data.

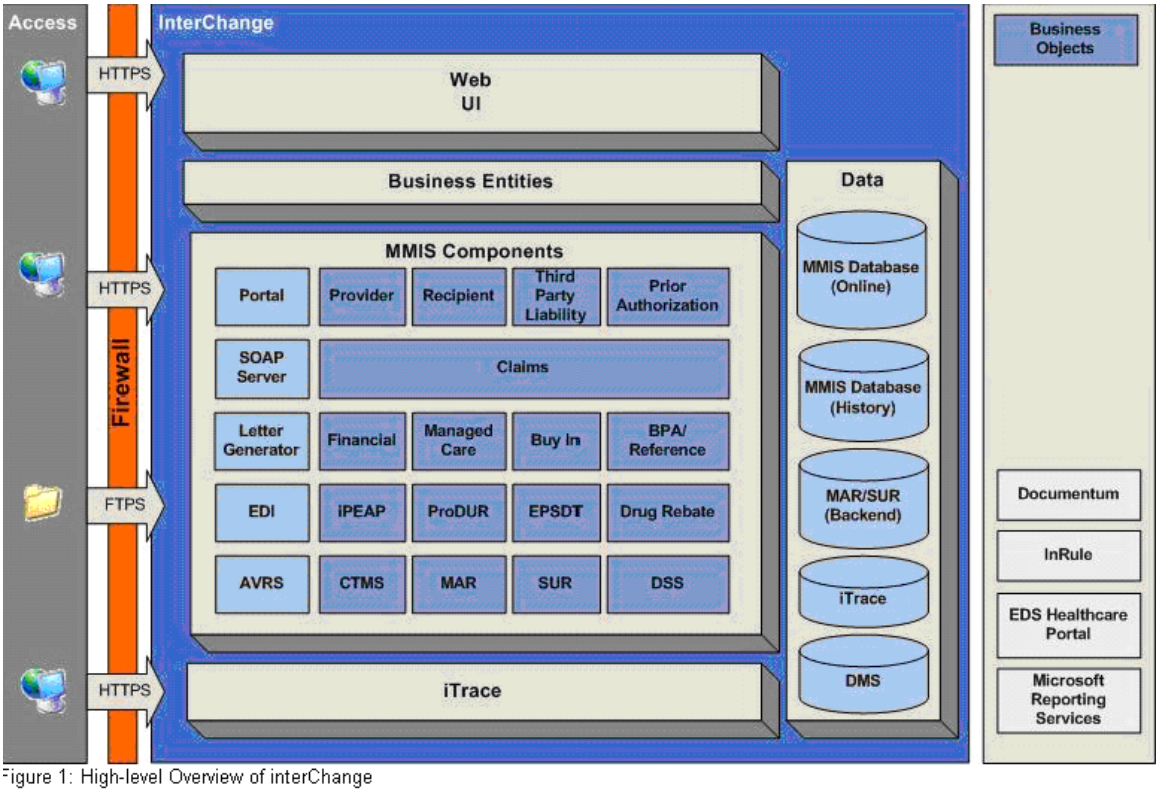


Figure 1: High-level Overview of interChange

As shown in Figure 2, this example figure of AMMIS is a multi-tiered system that provides the flexibility to interact with multiple external entities to load, filter, validate, and manage the data needed to service the stakeholders of the system. AMMIS is composed of a Presentation Layer, Technical Services Layer, Integration Services Layer, Application Layer, and a Data Layer. Each layer has a distinct role offering a scalable and extensible architecture that is sizable to any implementation.

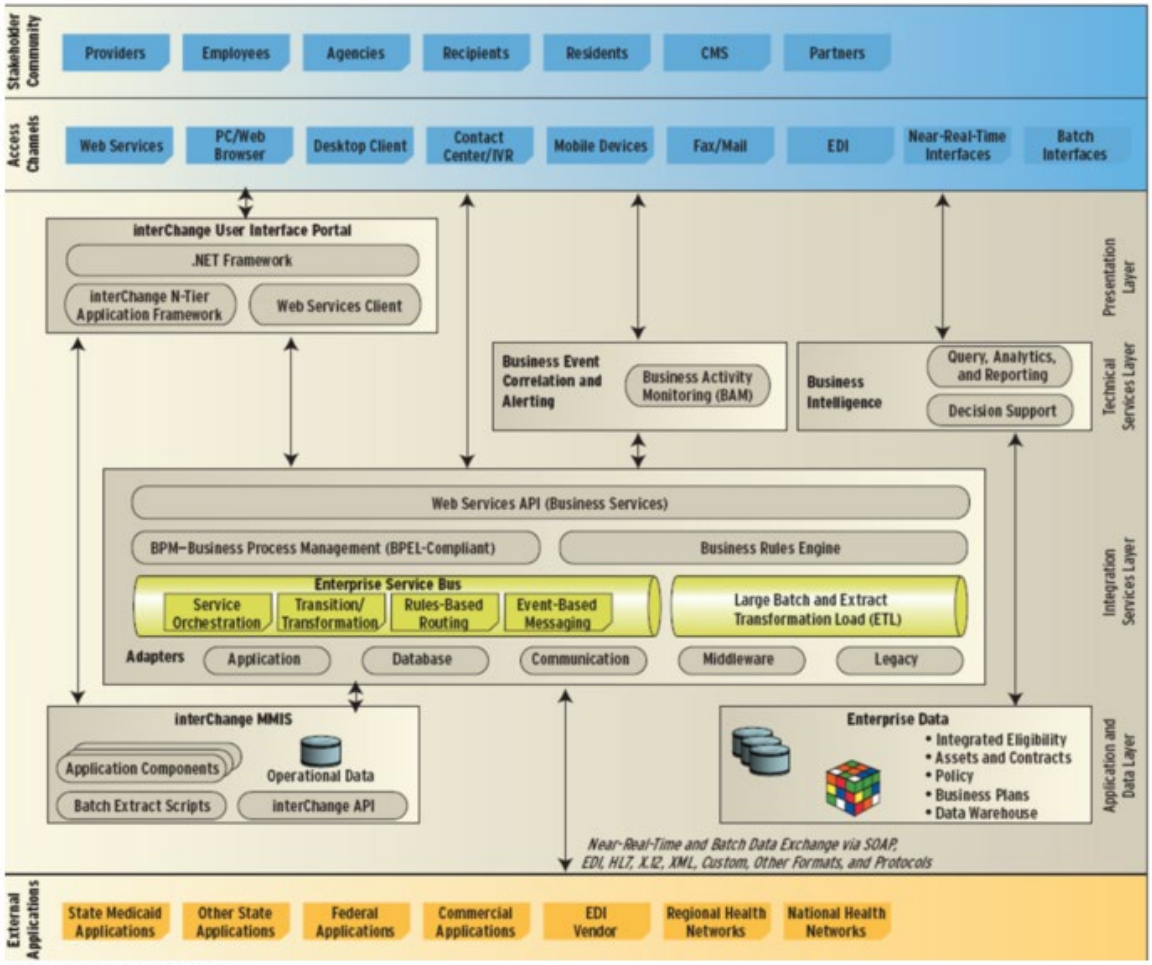
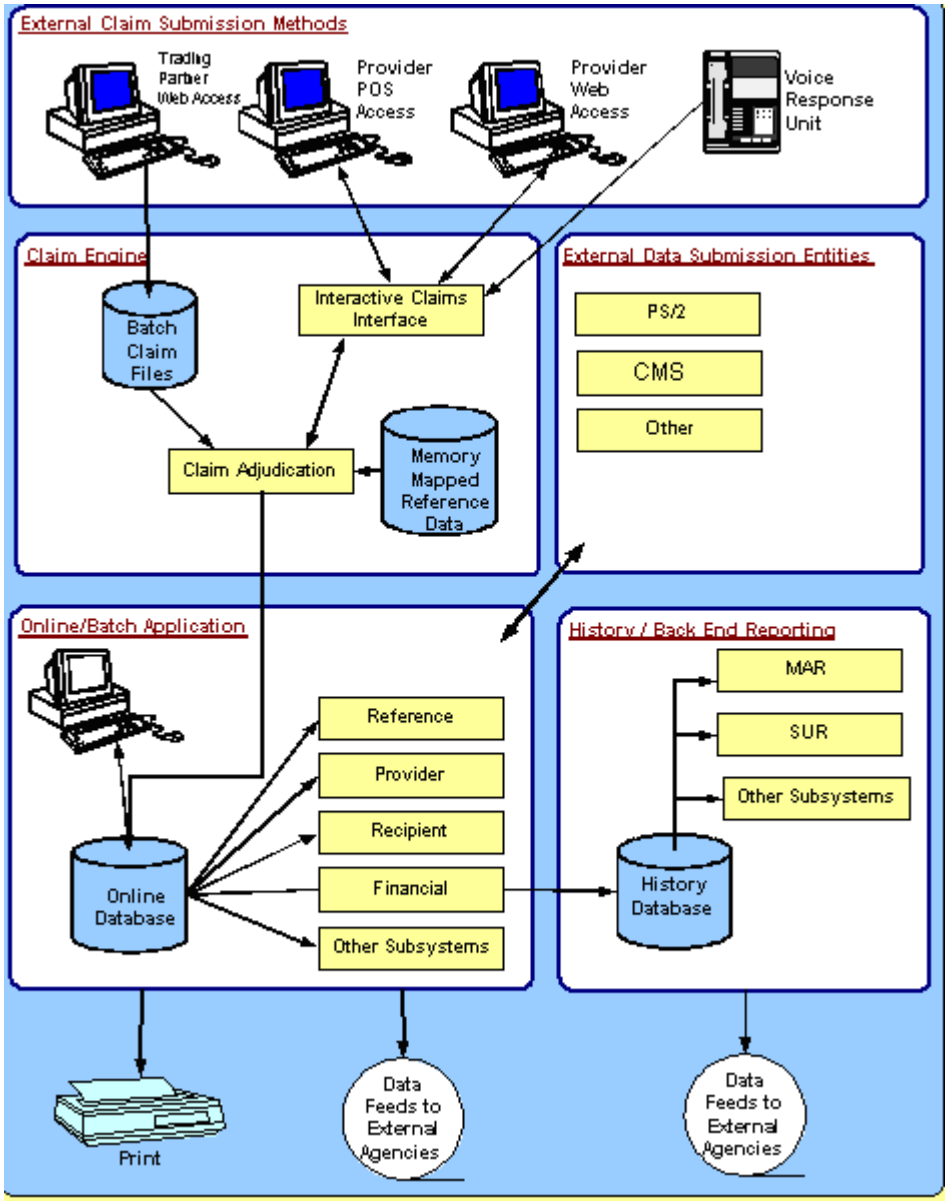


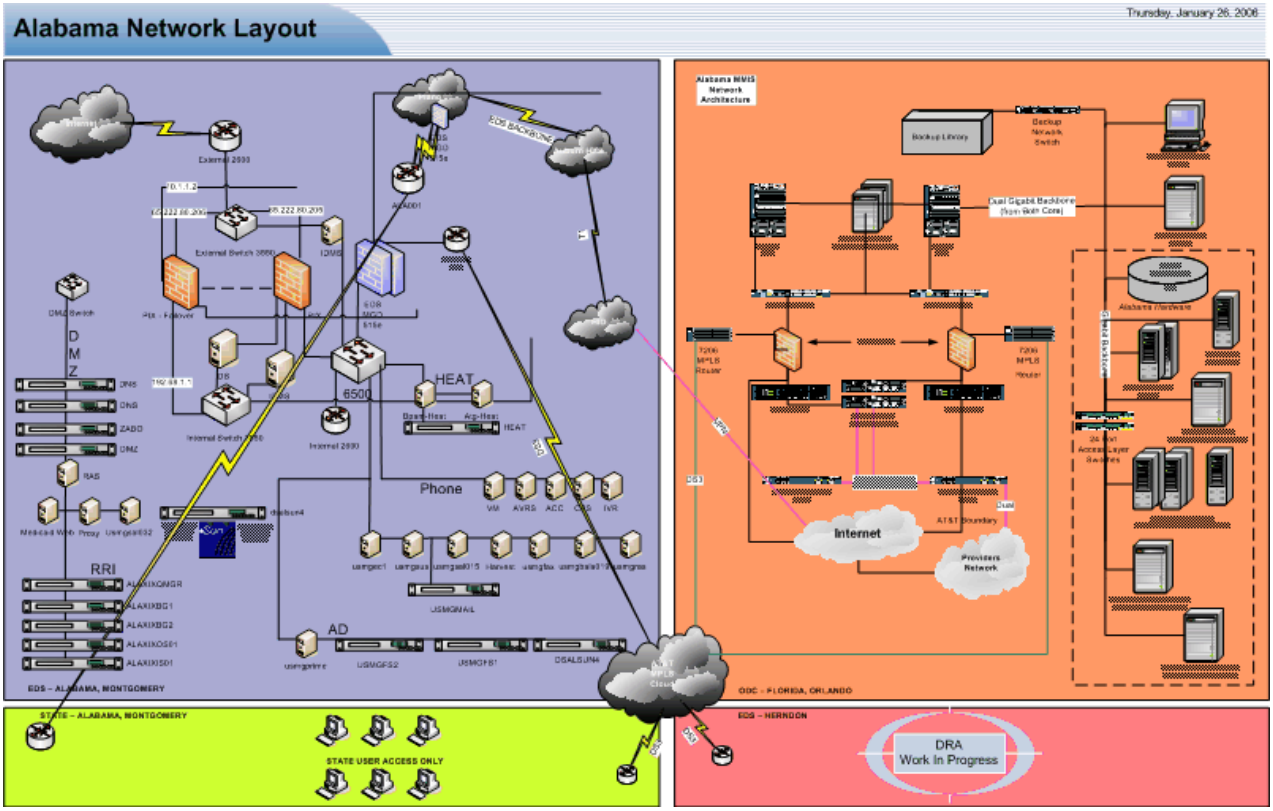
Figure 2: Multi-tiered view

The AMMIS system is logically divided into three primary components.

- The claims engine is responsible for receiving interactive transactions from external sources, adjudicating them, and returning the appropriate response (See Graph Below for an overview of claims submission methods). The online and batch components are responsible for maintaining and reporting on data contained within the online database.
- The history and back end reporting component is responsible for analyzing, reporting, and supporting the management of the activities that have occurred in the two front end systems.
- The external interfaces describe a variety of data sources which influence processing within the system. The external data submission entities are organizations that supply information to the AMMIS. PS/2 is the primary source of recipient eligibility information. CMS, for example, is a federal organization that supplies many different types of data feeds.



The existing legacy Alabama network and topology resides in Montgomery, Plano, and Auburn Hills. The AMMIS network is composed of hardware residing at the DXC account site in Montgomery, AL, and the DXC AMMIS data center in Orlando, FL. The topology is further described in the diagram below



The system supports current and future needs using proven client/server technology, industry-standard hardware, and software, and advanced communication interfaces to the State's systems. Users will become more productive because they have better and faster access to information as well as more flexibility to withdraw program information from the processing data.

A key factor in this system is its foundation on a true relational data model that is specifically designed to support Medicaid program requirements in a Relational Database Management System (RDBMS) environment. Prior to the system's original design, we defined events that are critical business functions of the Medicaid program administration. We then described those events as transactions, identified the entities (organizations or people) involved in the transactions, and the data required for the transactions.

The data model is the map used to build the system. It reinforced the model with the constraints of the database structure, which delivers strict data integrity. This "normalized" design minimizes data redundancy, and its intelligent structure yields strong referential integrity. For example, if business rules dictate that only one CLIA number occurs per provider, the unique properties defined in the database and the logic within the programs do not allow more than one Clinical Laboratory Improvement Amendments (CLIA) number per provider.

Analysis from a business perspective led the system architects to base the system on business processes and organize the data to support them. The initial design of the system, fully defined the data and each data relationship, which was critical to the success of the data model. This emphasis led to the system's data-driven or table-driven design.

For a system as complex as an AMMIS, this method is extremely important, particularly the ability to maintain such integrity over the years despite changing program and system requirements. The assured data integrity enhances the accuracy of historical data studies, fraud and abuse investigations, and program and waiver reporting. Properly designed and implemented, the relational database structure enforces data integrity and identifies anomalies in data for resolution before committing the data to the database.