Clinical knowledge management portal development
CUSTOMER
The customer is a leading health informatics company focused on improving the quality and value of healthcare, worker’s compensation and other employee benefits purchased by self-insured employers.

REQUIREMENT
The Clinical Knowledge Management System is an OLAP (On Line Analytical Processing) based project for a biotechnology research institute based in the United States. This clinical management portal offered data to subscribers for analysis of clinical data from various regions of the United States.

The customer had an existing product called Medical Management System (MMS), which was a Visual FoxPro based OLAP product with Oracle/MS SQL server as its backend. The product required an immediate revision to compete in the market.

The concept of Clinical Knowledge Management (CKM) is based upon the integration of data from disparate sources and systems into a coherent, unified healthcare data warehouse. The core of the CKM approach is a robust business intelligence application that rests upon the integrated data warehouse - called the Medical Management System (MMS).

SOLUTION:
The solution involved migrating MMS from customer server to web based .NET framework, which is known as CKM (Clinical Knowledge Management). Nous proposed to use MS SQL Server 2000 Analysis Services with backend being either MS SQL Server or Teradata and the front end being ASP.NET.

The key challenge with this particular project was, the application was from the traditional transaction (OLTP) based projects. It involved complex data analysis, reporting and graphing – i.e. take data from a data warehouse, create cubes and queries them effectively for analysis & reporting. We used a SQL Server Analysis Services for Business Intelligence solutions.

The major functionality of the portal is as listed below:

- **Extracting and Scrubbing Data:** The data for the portal was collected from various member hospitals that would push the data in a pre-defined format to a central location. The data that is in XML format and would be processed to cleanse the data and arranged in a format that the portal expects requires.

- **Graphical Analysis:** The portal had a third party component built-in, so that users could convert the data they have retrieved on a given criteria into multi-series, multi-dimensional graphs for their analysis. The graphical reports also enable users to drill down to lower levels from aggregate data to display details.

- **Report Building:** The portal allows users to arrange data they have retrieved into a printable format as desired. This would be converted into a PDF document for easy handling of the reports

- **Personalization:** The portal enables the users to customize the user interface of the web site to match their corporate intranet

HIPAA Compliant Application

- **Anonymization:** The data also had to be anonymized to meet regulations set by the US Government. Data - such as name and exact address, was removed and replaced by a unique number; this unique number was used for all analysis purposes and also this number was stored in the database against the name and exact address of the patient (name and exact address is encrypted) - so as to enable the portal to recognize the data for the same patient for future data. There was also a requirement to maintain and display the postcode for the patient to achieve regional profiling – this was done by encrypting the postcode by assigning a hash number.

- **Authentication:** The web site employed very strict authentication mechanism. Each user who needs to log in to the portal to access the data is issued a secure token, which is a hardware device of the size of a key chain that dynamically changes passwords every 60 seconds. The user has to use the user ID, the secure token ID and a 4-digit number that is pre-selected by the user to be allowed entry into the web site.

- **Security:** The portal is deployed over 128-bit secure socket layer that encrypts the transmission of data over the Internet and strong encryption was employed on the database side to secure sensitive data. The system also offers a very granular level control of data – the administrator can specify user’s access to the particular data.

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