

TECHNOLOGY AUDIT

InterSystems DeepSee









InterSystems

BUTLER GROUP VIEW

ABSTRACT

InterSystems DeepSee™ is a Business Intelligence (BI) solution that enables the real-time analysis of transactional data, and is designed to be optimal for embedding within transactional applications. Business users in healthcare, government, financial services, telecommunications, retail, and logistics require analysis and alerting based on current data for real-time decision making. DeepSee has four modules that provide capabilities for building data models, analytical elements, dashboards, and connections to external data sources. DeepSee provides additional analytical functionality to both InterSystems Caché® and InterSystems Ensemble® – two of InterSystems' long-established offerings. Caché is an object database; DeepSee data models are built using transactional data from Caché and therefore do not require a traditional data warehouse. Ensemble is an integration and development platform; DeepSee extends the orchestration capabilities of Ensemble, so that complex data analysis and decision making can be automated and embedded in applications. Although it is still early days for DeepSee, Butler Group believes that this solution is well positioned to meet the needs of the growing real-time BI market, and merits serious consideration from application developers and enterprises with an installed base of InterSystems technology.

KEY FINDINGS

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|  Data models are built using transactional data from an object database, without the need for a data warehouse. |  Provides modules for easily building data models, analytics, and dashboards. |
|  The underlying object-oriented Caché database enables rapid querying of complex multidimensional data. |  Bitmap indexing coupled with techniques such as compression further enhance querying performance. |
|  The client interface is currently restricted to Internet Explorer. |  Does not support advanced analytics, which might be a requirement in certain areas. |
|  InterSystems has 1,300+ application partners. |  Supports Windows, Linux, UNIX, Mac, and Open VMS platforms. |

Key:  Product Strength  Product Weakness  Point of Information

LOOK AHEAD

Future DeepSee enhancements include support for additional Web browsers, integration of InterSystems Zen™ Ajax framework and Zen Reports™, extended APIs, and native support for MDX queries.

FUNCTIONALITY

Organisations across a number of sectors, such as healthcare, retail, and financial services, need to take intra-day/real-time decisions based on current transactional business data. For example, call centre agents need detailed and aggregated information related to previous orders and buying patterns while speaking to customers. Intra-day, or even intra-hour, trends could help the agent streamline operations, such as cross-selling by recommending complementary products and predicting the appropriate time for, and volume of, reorder. The requirement of real-time intelligence based on current and detailed information is widespread, but for such a technology to be readily applicable to enterprises three conditions need to be met:

1. A real-time Business Intelligence (BI) solution would need to enable rapid development of data models, metrics, and UI elements. By definition, such a BI solution would need to be used by diverse enterprise user types (as opposed to a handful of analysts and strategic decision makers for mainstream BI), and all possible requirements cannot be foreseen at the time of implementation. So the traditional multi-year data warehouse development is not an option here.
2. The solution needs to be scalable to a large number of users and huge data volumes.
3. The solution needs to be embedded in transactional applications, so that the reporting and alerting capabilities are accessible through the business user's work environment.

Product Analysis

InterSystems DeepSee, released in 2008, is a real-time transactional BI solution designed to address the aforementioned requirements. DeepSee provides real-time BI capabilities for transactional applications and allows easy and flexible development of data models based on transactional data. DeepSee provides analytical elements, such as pivot tables and graphs; UI elements, such as dashboards; and connections to external data sources. Building DeepSee data models does not require the development of a batch-updated data warehouse, as they can use live transactional data. The data models can also incorporate external data, including historical data from third-party data warehouses, and data from external databases.

Founded in 1978, InterSystems is a privately held provider of a number of products, including Caché, an object database, and Ensemble, a rapid integration and development platform. The company has a strong healthcare sector focus, with a number of specialised healthcare applications in its solution portfolio. DeepSee depends on and utilises the capabilities of Caché and Ensemble.

The following list provides a brief description of the DeepSee core modules:

- **Architect** – This module is used to define data models based on real-time transactional data from Caché and also from external data sources.
- **Analyzer** – This module provides pivot tables and graphs through point-and-click/drag-and-drop capabilities, using the data models built by the Architect.
- **Designer** – With this module users build dashboards. These dashboards include pivot tables and graphs generated by Analyzer, and interactive controls, such as combo-boxes, lists, radio buttons and live links to relevant application functions and data to enable users to act immediately on the underlying query.
- **Connector** – The purpose of this module is to fetch external data from sources other than InterSystems Caché database for data modelling.

In addition to the DeepSee modules, the solution leverages Caché and Ensemble technology to offer a host of capabilities that are very directly applicable to transactional BI requirements.

InterSystems has a range of established products and offerings that support and augment DeepSee:

- **Caché** – InterSystems’ robust, immensely scalable object database with high-performance SQL is well suited to the analysis of large volumes of data. It incorporates the benefits of object databases and traditional relational databases. DeepSee data models are built from the transactional data contained within the Caché database. As would be expected of a database with object-oriented capabilities, the platform suits data structures that are inherently multidimensional and hierarchical, and is efficient from the point of view of application development as it obviates the need to translate the object structure of the application data to the relational model. Moreover, Caché delivers high query performance by obviating the need for join traversals. The query performance on object databases for such data structures and complex queries is typically an order of magnitude higher than that with relational databases (InterSystems claims an SQL performance improvement over relational databases by a factor of five). The hybrid nature of the database allows for traditional SQL querying as well. In addition to the inherent benefits of the object database, bitmap indexing technology is used for superior query performance. Bitmap indexing technology indexes records by assigning binary values to properties, with a 1 indicating if the record has the property value and zero if it does not. While optimising query performance, bitmap technology usually involves trade-offs, such as higher update overheads and disk space usage. However, InterSystems’ transactional bitmap technology addresses these issues through the use of compression and other engineering techniques.
- **Ensemble** – The integration of DeepSee with line-of-business within composite and process-based applications is an important aspect of InterSystems’ offering, and this is achieved through the use of Ensemble – InterSystems’ application integration platform. Organisations using Ensemble can integrate DeepSee dashboards with the existing applications, create intelligent workflows, and, in conjunction with DeepSee Connector, use DeepSee’s BI capabilities to analyse aggregate data from multiple data sources. InterSystems Ensemble is used in enterprises worldwide to develop and integrate mission-critical applications, leverage previous software investments through composite applications, establish an enterprise service bus, or implement Service Oriented Architecture (SOA) initiatives. Similar to Caché, Ensemble also has a sizeable installed base in the Healthcare sector. Ensemble is a unified framework that contains a message repository, process states, and process metadata. The solution is comprised of a development environment that provides: Business Process Management (BPM) with process orchestration and workflow; a messaging infrastructure that supports a number of messaging standards; data transformation; a business rules engine; a Business Activity Monitoring (BAM) engine; and a comprehensive library of connectors to common applications, data sources, and communication protocols.
- **Partnerships with vertical solution providers:** Around 70% of InterSystems’ US\$255 million in revenues accrues from a network of over 1,300 partners who develop sector-specific software for various industry verticals, including Healthcare, Government, Financial Services, Telecommunications, Retail, and Logistics. These application providers bring in deep knowledge around sector- and organisation-specific requirements which, in Butler Group’s opinion, is essential for a solution of this type. It is the domain knowledge that provides the value-add; not the technology per se. A number of application providers and Systems Integrators (SIs) support this solution, including: QuadraMed Corporation, Sunquest Information Systems, and HCL Technologies.

For those organisations with large user populations and/or huge data volumes, DeepSee uses Caché which InterSystems has tested to scale to 100,000 concurrent users.

InterSystems continues to build out its range of offerings, and Butler Group is impressed with the company's solution strategy. Butler Group believes that a wide range of use cases exist for this solution, but those organisations with an installed base of Ensemble and Caché technology will undoubtedly be the first to reap the benefits of this new offering.

Product Operation

DeepSee provides real-time BI technology for embedding within transactional applications. Through the inclusion of this product, users will gain additional insight into business information, thereby supporting better decision-making.

A typical DeepSee implementation process would involve an application architect defining the Key Performance Indicators (KPIs) in conjunction with the business manager and users of the application. Based on these KPIs, the data (transactional data from applications and external data) to be analysed is treated/organised and a data model is built. External data can be included using Ensemble and the DeepSee Connector. After the data model has been built, components that aggregate this structured data into meaningful information are developed. The analysis, which is typically expressed in the form of visual components such as pivot tables or charts is included in dashboards which are embedded within the application. The solution does not need a data warehouse as it fetches data directly from the high performance Caché database.

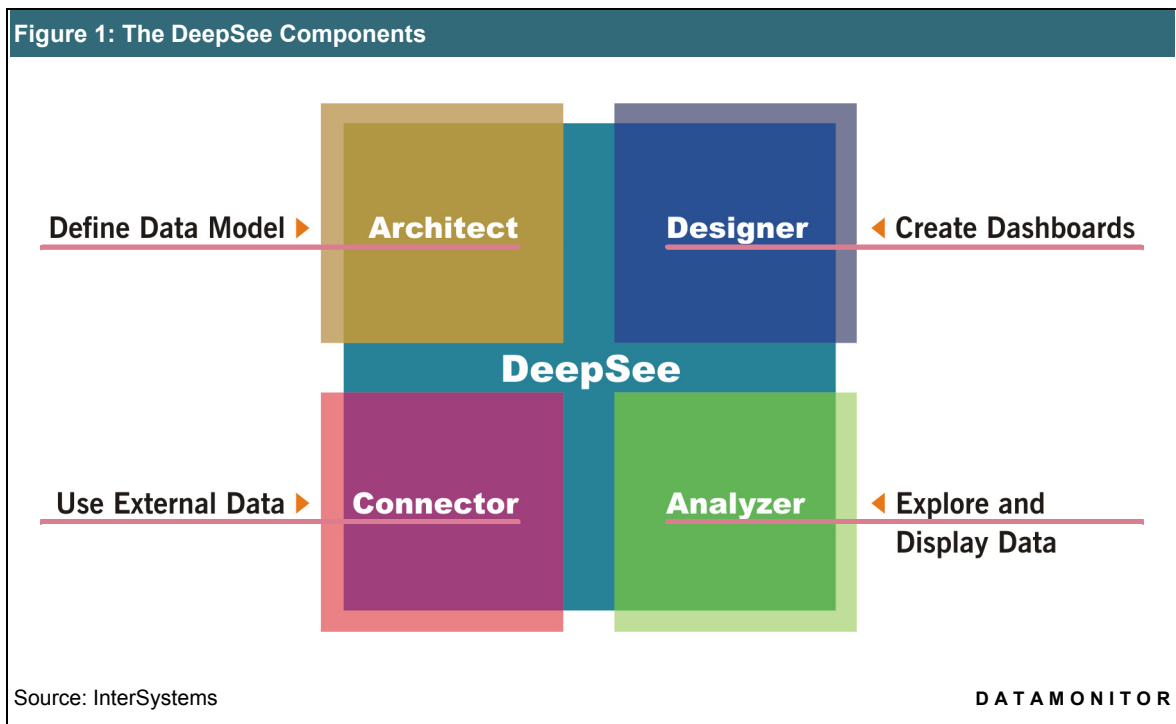
DeepSee includes four main components:

Architect – DeepSee Architect is used to build data models based on the current transaction data from within the applications (in the Caché database) and outside the system. This module is used to specify the data required for aggregating KPIs, name the KPIs, define the data dimensions, and specify the indexing mechanisms. Data models are created by selecting information from one or more Caché classes. All classes that have relationships with the selected classes are then available to the Architect. For example, a model including the Order class automatically has access to related classes (i.e., Customer and Shipper). The properties of Order, Customer, and Shipper are available in the model/cube as a dimension, measure, and detail listing field.

Analyzer – Using the data model defined by DeepSee Architect, end users can create pivot tables, graphs, and charts. This module allows a lot of flexibility to select subsets of data and drill-down to detail data. A subset of a table can be viewed by filtering from the pivot table, and dimensions can be customised according to the requirements. It can also link multiple pivot tables to create complex layouts. The data in the tables can be updated in real time by refreshing.

Designer – DeepSee Designer is used to create dashboards that contain pivot tables, speedometers, detail listings, radio buttons, dropdown list controls, etc. Dashboards can be designed by a specialist or can be customised by an end user if they are provided with dashboard design rights. The colour, font, and aesthetics of the dashboard can also be easily customised in accordance with the organisation's branding. Dashboards are Web pages that are embedded into applications. Also, dashboards contain links to relevant application functions and data.

Connector – DeepSee Connector is used to fetch external data. The connector creates BI-enabled Caché classes to model the data in external databases so that it can be used in the pivot table. When the connector generates the classes, it generates class methods for loading the data. During the implementation process, DeepSee Connector is used to integrate pivot tables into applications. It can also be used to define cleaning rules and cleaning scripts, test the data loading methods, browse the data, and add additional properties depending on multiple fields.



DeepSee uses the scalability and the high-availability features of Caché. The same database can be accessed by two or more servers which are configured such that in the event of failure of one, the other takes on its job. Servers can also be implemented as failover clusters where multiple data servers could be used to share access to a database, while only one is active at a time. The standby server takes over in case of the failure of the active server. This might result in a small delay in the transactions, but it prevents them from getting lost. Another way to ensure high availability is through a shared database cluster, where all the members of the cluster simultaneously access the database. However, this approach requires additional hardware and administration. Caché supports shared database clusters on Alpha OpenVMS and TRU64 UNIX platforms.

DeepSee can use the Caché shadowing technology to maintain a duplicate database in real time. The transactions that have not been shadowed while a failure occurred can be easily rolled back. Shadowing for a clustered system enables high availability and database state retention.

Product Emphasis

InterSystems DeepSee focuses on three key aspects:

1. Providing existing Caché and Ensemble users with a real-time BI solution through the company's numerous application provider partners - in effect embedding BI capabilities in core transactional applications.
2. Providing a flexible and rapid data-model development capability based on Caché and obviating the need for long drawn-out data warehouse projects.
3. Providing an easily customisable set of core BI elements, such as analytics and dashboards, which provides a great deal of flexibility for a diverse set of users.

Butler Group believes that this product is directly applicable to the real-time analysis needs of many organisations – especially those with existing investments in InterSystems products and technologies. DeepSee scores well in terms of core analytical capabilities, and the flexibility afforded by the capabilities of Ensemble and Caché would be hard to replicate by any of InterSystems' competitors. Organisations with extensive reporting requirements will probably need to consider other vendor offerings, such as Crystal Reports. Although, InterSystems does plan to incorporate comprehensive reporting based on its Ensemble and Zen Reports technology.

DEPLOYMENT

DeepSee is typically deployed by InterSystems' impressive ecosystem of application and service partners. InterSystems has more than 1,300 such alliances. According to the company, the average time for a basic implementation is a few hours, with benefits that can begin to be realised in just a week. However, Butler Group is sure that larger projects in terms of scale and complexity are likely to take considerably longer. Importantly, InterSystems expects DeepSee to enter the market as an embedded technology within its own and partner applications. With typical application development cycles of between six and 18 months, the functionality offered by DeepSee may take a while to appear in existing applications.

Along with its partners and affiliates, InterSystems provides the training, conducts examinations, and offers certification to client organisation personnel for their specific applications and domains. Training is provided either on site or through Web-based facilities. InterSystems provides technical support to its clients in many languages via a distributed worldwide response centre that operates 24x7x365. Application partners provide industry domain-specific support for DeepSee implementation.

DeepSee is available on Windows, Linux, UNIX, Mac, and Open VMS platforms. Integration is required when data needs to be fetched from applications, processes, or repositories that do not converse natively with InterSystems technology; however, this can be readily achieved through Ensemble and DeepSee Connector.

The risks to DeepSee implementation and adoption include complex application development cycles which could also delay BI implementation. In addition, InterSystems believes that for full benefit realisation, the BI implementation strategy needs to be enterprise-wide and not application specific.

PRODUCT STRATEGY

The target market for DeepSee is both horizontal and vertical; however, the company and its application partner network principally focus on the clinical healthcare sector. Other market focus areas are government, financial services, telecommunications, retail, and logistics. InterSystems reports that the expected Return on Investment (ROI) varies by industry.

The route to market is both through InterSystems' ecosystem of partners and direct to enterprise customers. The partner community currently accounts for 70% of InterSystems' revenues.

InterSystems technology partners include Intel, HP, IBM, Sun, and Microsoft. Business partners include QuadraMed Corporation, Sunquest Information Systems, and HCL Technologies.

Maintenance is priced at 22% of the list price charged by DeepSee application partners.

The company provides two major functional releases every year, and interim ad hoc releases that address critical issues, on demand. The future developments planned for the solution include integration of the InterSystems Zen™ Ajax framework, Zen Reports, extended APIs, and native support for MDX queries into DeepSee; with expected releases during 2009. Butler Group believes that the incorporation of the Rich Internet Application (RIA) development platform into DeepSee will enable even greater flexibility and accelerate product adoption.

Overall, InterSystems' strategy can be summarised as embedding real-time BI technology and functionality into business-specific transactional applications. The company continues to enhance the flexibility and the ease of development and use of DeepSee. Butler Group believes DeepSee will enhance InterSystems' portfolio significantly, and will provide additional enticement to those customers already making use of Caché and Ensemble. Moreover, as the BI market continues to evolve, we could see InterSystems receiving increased interest from vendors in this and adjacent markets.

COMPANY PROFILE

InterSystems is a privately held software company headquartered in Cambridge, Massachusetts, US with US\$255 million in revenues. The company was founded in 1978 and has offices in 22 countries (Australia, Belgium, Brazil, Chile, China, the Czech Republic, Denmark, Finland, France, Germany, India, Israel, Italy, Japan, Korea, Russia, Spain, South Africa, Switzerland, United Arab Emirates, the United Kingdom, and major cities in the United States). While InterSystems solutions are relevant to a number of industries, the company is primarily focused on the healthcare sector. Key clients include: TD Ameritrade, Airwide Solutions, Barts and the London NHS Trust, Shlomo Group, Cedars-Sinai Hospital, the Department of Veterans Affairs, the Brazilian Federal District Government, Westpac Bank, Cleveland Clinic, Johns Hopkins Hospital, Kaiser Permanente, Plymouth NHS, Vodacom, Credit Suisse and Kimberly-Clark, among others. InterSystems has millions of solution licences in operation across a range of different licensing agreements, including: concurrent users, named users, computing capacity, Web user access, application-to-application, and device access.

There are approximately 800 employees in the organisation and in the next 12 months the figure is likely to increase by up to 20% depending on government health investment plans in a number of countries.

The revenue forecast for the current year is US\$300 million. The geographical split of revenue by region is 30% from Europe, 15% from APAC, and 55% from North America.

SUMMARY

Butler Group believes a number of trends outside of the mainstream data warehouse-driven and power user-driven BI is clearly visible. BI is definitely evolving towards being more ubiquitous within the enterprise, based on real-time data, and based on data models unmodified from the ones driving transaction processing systems. A number of vendors now provide in-memory analytics and analysis from transactional processing systems using Massive Parallel Processing; however, with DeepSee, and an installed base that allows for quick BI implementation and integration of BI with core business processes and transactional applications, InterSystems has found and dominated a rich niche. The combination of an object database and an application integration platform is an offering that only some of the largest software vendors can offer. InterSystems itself has over US\$255 million in revenues, is profitable, and has a large global installed base. Overall, Butler Group believes that the introduction of DeepSee into InterSystems’ portfolio of products will offer significant appeal to existing customers, and will also serve the company well as it seeks to extend its footprint on the BI landscape. Although DeepSee is likely to surface in healthcare applications before those of any other sector, this does not imply that this product is only suited to this area. Butler Group believes that DeepSee could be applicable across a range of markets and business applications; especially those handling large amounts of data.

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