

# Lotus Notes Enterprise Integration

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Developments in the technology and business of Information Management are driving demands for greater integration of Lotus Notes with Enterprise Information Architectures. These demands, if fully met, could transform the role that Lotus Notes plays in the enterprise.

## Lotus Notes in the Information Architecture

IBM's Lotus Notes (for our discussion, we include Lotus Domino as part of Notes) is into its eighth major release and has been in production for over twenty years. Rather than fading away into irrelevance or being overtaken by a hot new technology, Notes has grown and evolved over the years. The marketing message may have changed: Groupware, Web Collaboration, Document Management, Knowledge Management, Enterprise Messaging, Composite Applications, but the core Notes capabilities have evolved and continue to define a major market segment. The combination of rich content store, integrated services, rapid development environment, support for web standards and rich collaboration has created and sustained opportunities for corporate developers and independent software vendors (ISVs) to create rich collaborative applications. Many organizations maintain hundreds, if not thousands, of Notes applications to manage collaboration, tracking and routing business requirements. In spite of its detractors, no other software platform has matched the flexibility, low cost of entry and richness of capabilities that Notes offers for collaborative applications.

Historically, Notes applications have tended to stand alone. Notes applications have been self-contained and have had only minimal integration with other enterprise data services and applications. For this reason, many IT directors have come to view Notes as standing outside the enterprise information architecture and not being an important enterprise platform. The limited options for Notes connectivity, as perceived or realized in most corporate installations, have only served to validate these prejudices. In fact, Notes does play a critically important role in the enterprise, but since this is seldom discussed or promoted, it remains a well kept secret. At its core, Notes is a powerful platform for managing semi-structured information in the organization.

People understand immediately when we talk about structured or unstructured information. Structured data is the tightly defined row and column type data stored in relational databases and accessed in data warehouses. Tools for managing structured data are powerful and mature, with Structured Query Language (SQL) the defining standard for accessing and manipulating structured data. Structured data has well defined metadata that describes the structure of data elements.

Unstructured data refers to discrete desktop files in file systems and HTML pages in web sites. Unstructured data has little, if any, metadata and is typically accessed through text search or inflexible directory tree structures. Content management tools manage unstructured data by applying metadata labels, keywords and access control, but each unstructured data file pretty much stands alone.

As an environment for managing semi-structured data, Notes serves the requirements for information management in that space between structured and unstructured data. The Notes rich content data store (NSF file) supports rich unstructured content including formatted text, composite documents, file attachments, HTML and XML. At the same time, Notes forms define data fields

which add structure to the Notes rich content. Notes fields provide the metadata or business context to categorize, route or aggregate groups of related documents into meaningful structures. Notes rich text fields contain formatted text, embedded graphics and file attachments, providing the contextual richness of unstructured text.

All of this is supported in a single integrated development environment. When you add to this the Notes directory, security and routing services, Notes provides a complete platform for building applications that exploit these semi-structured capabilities: collaboration and knowledge sharing (e.g. team rooms), tracking (e.g. customer management, production management) and routing (e.g. call centers, ad hoc workflows).

Recent development by Lotus highlights Notes' strength as a routing engine for ad hoc workflows. The new Alloy integration with SAP utilizes Notes as a sort of universal inbox for simple workflows driven by SAP processes and provides broader business context through Notes composite application services. This highlights the capabilities of the Notes routing engine and Notes composite applications, but it does not take full advantage of the semi-structured data management that Notes provides. Up until now, tools for integrating Notes with enterprise applications and data sources have been too limited and cumbersome to allow Notes to meaningfully integrate into the enterprise information architecture.

### **A Metadata-based Approach to Notes Integration**

The Sun & Son Data Modeler for Notes (S&S Data Modeler) is a full-featured tool set for creating metadata models and managing metadata services for Lotus Notes applications. Through standard metadata models, Notes can be easily integrated with business intelligence, data warehouse and other enterprise applications.

Whereas metadata concepts are new to the Notes world, they are established standards in the world of information management. Metadata is the standard way that structured data is defined in relational databases, the way it is transformed and loaded into data warehouses and the way it is accessed by business intelligence tools for reporting and analysis. Metadata definitions are the standard for accessing data across applications or moving and transforming data from one data store to another. Metadata definitions are also used for integrating disparate applications and data stores through Service Oriented Architectures. On the unstructured data side metadata is often referred to as Business Metadata and generally refers to standard business definitions (through glossaries), keyword indexing and tagging.

IBM has committed significant resources over the past few years to developing an integrated world class offering in the area of data and metadata management. It has made a number of strategic acquisitions in this area and has invested resources to integrate new and existing products into a complete and seamless technology offering. The result is the IBM InfoSphere product line, which is anchored by InfoSphere Data Warehouse and InfoSphere Information Server. InfoSphere includes a broad set of tools for information integration, master data management and specific industry models.

Up to this point, the activity around metadata management has been focused primarily around the traditional metadata domains of data warehousing and business intelligence. There is now a growing awareness of the need to provide metadata management for unstructured as well as structured data, and some new capabilities around business metadata are beginning to address this need. Up until now, Lotus Notes application data has not been specifically addressed through these metadata technologies. The Sun & Son Data Modeler for Notes now produces metadata models for Notes applications which transform the rich set of semi-structured Notes data into standard formats that can be incorporated

into the InfoSphere suite of products. With these standard models it is straightforward to start using the IBM data integration products with the huge installed base of Lotus Notes applications. Mature and powerful metadata management technologies exist now. The missing key for Notes integration has been the lack of metadata services for Notes, and the S&S Data Modeler for Notes fills this need.

### **The Unifying Role of Cloud Computing**

The most compelling new development in IT is Cloud Computing. This is the delivery of mature Software-as-a-Service offerings through an amorphous 'cloud' of servers, software and services. All of this is transparent to the user, who simply accesses his software securely across the internet when and where he needs it. Cloud Computing offers massive economies as server resources are virtualized and are allocated to specific customer needs as required. Analysts estimate that up to 25% of new software will be delivered as a service by the end of 2009. Established software heavyweights like IBM, Oracle and Microsoft are being joined in this market by relative newcomers Google and Amazon. Whereas Cloud Computing might appear to be a natural extension of the On Demand message that IBM has been promoting for years, in reality it is a disruptive technology that challenges existing software vendors by turning existing product and revenue models on its head. Cloud Computing forces a new look at software branding, software development, software sales and sales compensation. Cloud Computing has the potential to compete directly with existing software products and cannibalize existing revenue channels. At the same time it offers the opportunity for an established vendor like IBM to transform its software business.

IBM software is developed and sold through specific software brands: WebSphere, Information Management, Lotus, Tivoli, etc. Software requirements and customer value are compartmentalized according to these divisions: collaboration and messaging is Lotus, database and business intelligence is Information Management, etc.. As a result software sales and deployments tend to be siloed by brand with cross brand integration generally falling as a secondary priority. Cloud Computing promises to hide the seams between individual software products and software brands. If a customer wants to buy a cloud computing solution which integrates business intelligence, data warehouse and collaboration, he is going to focus on the complete functionality that he wants the vendor to deliver, not on the component software modules and the integration required between them. Ideally the software vendor will deliver a set of software services that are completely integrated to meet the customer requirements. With this model, the greater breadth and depth of products and services the vendor can offer, the higher the value of the Cloud services the vendor can provide by bringing together these best of breed products. The delivery of Cloud Computing services crosses brand, application and platform boundaries and creates highest value based on the most complete integration of software services that can be delivered.

The Cloud Computing model promises to play to all of IBM's strengths. IBM leads in large scale server technology, both mainframe and distributed, it has the broadest and most complete platform and middleware software, and it has global consulting and software outsourcing services. By aggressively embracing the Cloud Computing model, IBM has the opportunity to create a unified marketing message and a set of offerings that bring together the capabilities of Server Group, Software Group and Services Group. It is still early in the process, but the promise is great.

As Cloud Computing is driving the integration of heretofore distinct technologies, the value of integrated collaboration becomes obvious. All software services are enhanced by including the ability for users to communicate, collaborate and share the content that they are otherwise viewing or using. Different pieces of

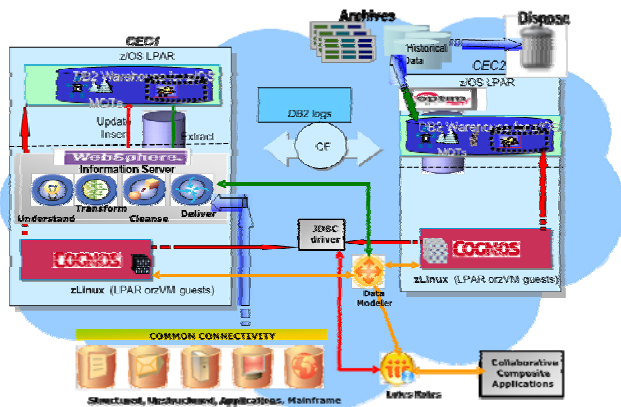
information also take on a much greater value when combined into a composite application interface which is tailored to the user's role or activity. Collaboration and composite application technology provided by the IBM Lotus brand lead the market. Whereas up until now Lotus software has been sold to meet specific collaboration requirements, it now promises to enhance the value of all IBM cloud solutions through a complete and seamless integration. Notes, as the flagship of the Lotus brand, will be central to an integrated IBM cloud offering. This will drive the integration of Lotus Notes applications with other IBM services in new and compelling ways. Critical and necessary to this integration will be metadata services for Notes.

### An Integrated Enterprise Architecture for Collaborative Data

Sun & Son is working closely with IBM on a number of fronts to provide all of the critical integration points for Lotus collaborative data into a completely integrated enterprise information architecture.

#### 1. Expand Data Cloud Architecture to include Notes Semi-structured Content

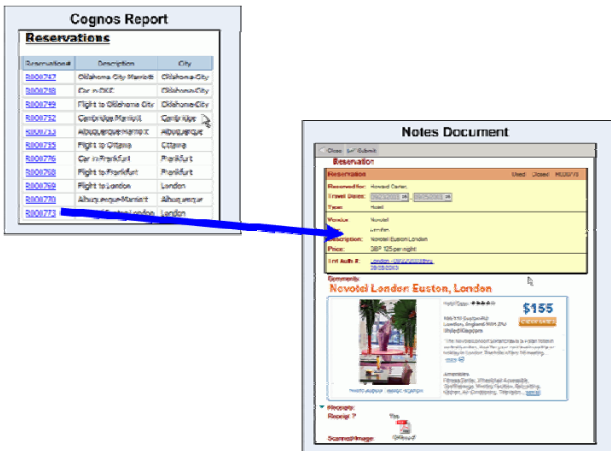
The Sun & Son Data Modeler for Notes provides the critical link to Notes data for Data Cloud data warehouse and business intelligence services. Through common metadata services Notes data can be integrated into Cloud data warehouse services and take advantage of the full set of IBM data management tools. Notes application data can be transformed into true relational data structures and then processed through standard ETL (Extract - Transform - Load) data warehouse processes. Notes brings real-time Collaborative Business Intelligence services to Data Cloud services. This includes real-time access to Notes data and drill-down in place into the rich context of the Notes environment. Data Cloud services are enhanced through the integration of the large body of semi-structured data stored in Notes applications and team spaces. This semi-structured data can be linked with structured data from enterprise applications to provide a seamless view of enterprise operations. By linking



attachments acquire greater business context and become more widely accessible. This integrated architecture drives demand for broader Lotus services and enhances the value and competitive positioning of IBM Data Cloud services.

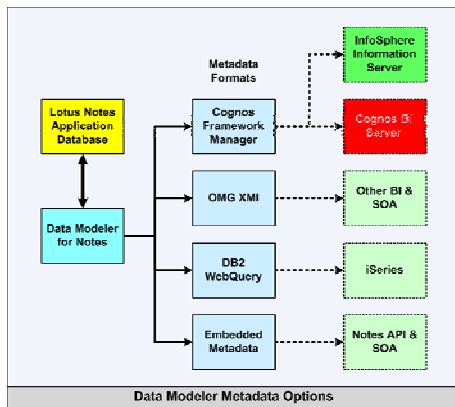
#### 2. Deliver Collaborative Business Intelligence

The metadata services for Notes provided by the S&S Data Modeler bring Collaborative BI capabilities to Cognos BI. Collaborative BI links together the powerful reporting and analysis capabilities of Cognos BI with the rich context of Lotus Notes and Lotus collaboration. Business Intelligence tools are optimized for highly structured tabular data. Notes, on the other hand, manages rich semi-structured data which includes formatted rich text and attachments as well as routing and workflows. Collaborative BI brings these two worlds together in an integrated solution which realizes the best of both environments. BI applications can access Notes data directly through structured Notes fields. Hot links allow the user to drill down from the Cognos report directly into the highly collaborative Notes environment, either in the Notes client or in a web browser. Through Notes drill down, all of the collaborative capabilities of Notes become available through the Cognos report. The result is higher value to the customer from a fully integrated solution.



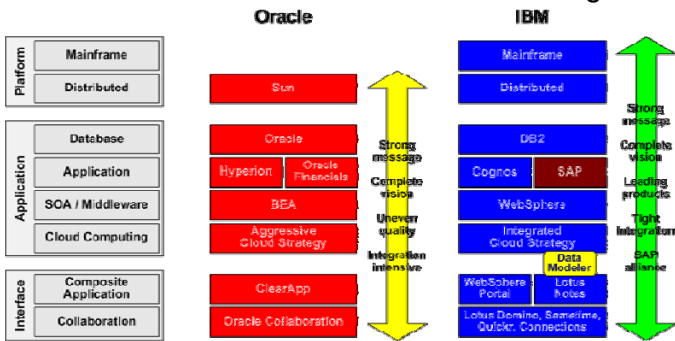
### 3. Integrate Notes with Enterprise Information Architecture

Enterprise Information Architectures typically focus primarily on structured data. It is generally accepted that 85% of business data is not structured, i.e. not stored in relational databases. This 85% is unstructured or semi-structured data. Since Notes is the leading platform for managing semi-structured data, the inclusion of Notes in an enterprise information architecture creates a much more complete and compelling architecture, including structured, semi-structured and unstructured information. This can be done now using existing data management software tools and by leveraging Notes metadata. Notes metadata definitions produced by the S&S Data Modeler can be imported into the InfoSphere Information Server using standard Cognos Framework Manager metadata formats. At this point, of the InfoSphere data management tools can be used with any Notes data. This provides full metadata life cycle management for Notes data. Similarly, Notes metadata definitions tie Notes application data to Service Oriented Architecture (SOA) through business process modeling and brokering software.



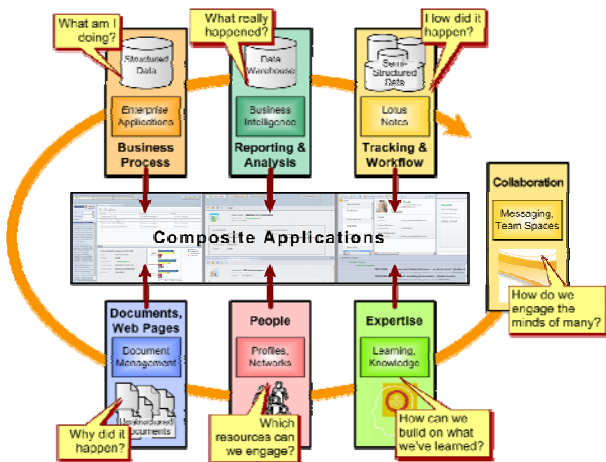
### 4. Strengthen IBM Competitive Position

In the current competitive landscape, IBM competes primarily with Oracle in the information management area and with Microsoft in the collaboration area. Both competitors have strong offerings; this leaves buying decisions often to specific feature comparisons or vendor preferences. Through tight integration at the metadata level, IBM is able to offer a tightly integrated platform which includes world class data management, business intelligence and collaboration. This integrated offering far exceeds the capabilities that can be provided by competitors and greatly enhances IBM's competitive position.



### 5. Enrich Composite Application Offerings

IBM offers web-based composite applications through WebSphere Portal and rich client composite applications through the Notes 8 Eclipse client. Both platforms bring data together from disparate sources into an integrated composite interface. Since composite applications are inherently collaborative, both platforms access Notes data extensively. The standard tool provided by Lotus for rendering sets of Notes documents is the Notes view. Views offer only limited capabilities for visualization of Notes content. BI tools offer rich and powerful visualization capabilities through charts, graphs, scorecards, etc. By integrating BI and Notes at the metadata level, users can present Notes data in much more accessible and compelling ways in the composite application environment. Additionally, Notes data does not have to be viewed separately for each NSF file as with Notes views. BI reports can aggregate data across multiple Notes databases or join Notes data with other enterprise data in the same report. Composite applications gain richer visualization for Notes data and at the same time benefit from Collaborative BI drill-down to live rich content.

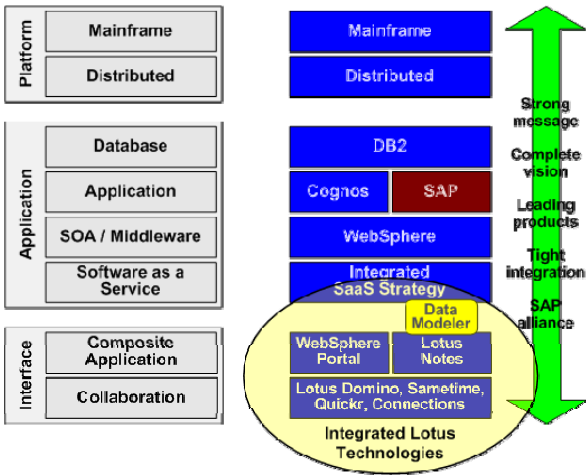


### 6. New Capabilities for ISVs

In the past, ISVs had the choice of building their solutions on the Notes platform or using other technology (J2EE, .Net, etc.) This was pretty much an either/or decision. Some ISVs found the Notes platform so compelling that they built their tracking or routing applications for Notes, e.g. customer management or call center applications. Others were forced to develop or move their existing applications to other platforms, often at greater cost, due to limitations of the

Notes platform. Metadata integration now creates opportunities for ISVs to create hybrid applications that link Notes and other application platforms. This can be as simple as providing professional reporting for a native Notes application using BI reporting. It can also include integrating Notes collaboration with enterprise applications and ERP systems. This allows the ISV to utilize Notes for those collaborative requirements for which it is best suited, while using relational databases or other applications for the native capabilities they provide. One example of hybrid application is Lotus Alloy. This takes SAP workflow definitions and uses Notes as the delivery mechanism for ad hoc workflows on the desktop. Alloy does not take advantage of Notes metadata integration at this point, but in the future promises richer visualization of data on both platforms through integrated reporting and Collaborative BI. This will take full advantage of the Notes collaboration and composite application services.

**7. Bring Lotus Technologies Together**



Metadata integration makes Notes a compelling part of the IBM data cloud architecture. As such, it serves to drive greater integration between Lotus products with other IBM software technologies and between Lotus products themselves. Cloud integration has stimulated discussion and planning around Domino server virtualization. This will not only integrate Notes more tightly into the Cloud, but also promises to remove the scalability limitations that have hampered broader deployment of Notes in many organizations. As we have seen, the increased prominence for composite applications in the Cloud architecture leads to tighter integration between Notes and WebSphere portal (also Lotus product). Similarly, an enhanced role for Notes in the Cloud will create greater demand for other Lotus products such as Sametime, Quickr and Connections. In order for these products to better integrate into a cloud architecture, they will also require access to metadata services. The natural approach will be to extend the technologies for Notes metadata management to these other Lotus products as well.

**8. Support IBM Platform Initiatives**

As we have seen, Cloud Computing is an important stimulus to integrating IBM software offerings. Cloud also supports IBM hardware brand platform initiatives. The IBM Data Cloud offering is being driven in large part by System z, the mainframe group. The new generation of z servers makes an ideal platform for cloud-based services. The z platform is highly stable, highly secure and is well optimized for server virtualization for on demand cloud services. Additionally, z is highly energy efficient compared to distributed platforms with similar capacities. z-based Green Data Centers add value and benefit to the cloud architecture. SAP is a major partner for System z, so the SAP Notes integration in Alloy enhances the value of the z platform. On System i, Notes is the leading collaboration and messaging platform, but to date has not been integrated with other services on that platform. Through metadata services Notes now integrates with native business intelligence software and facilitates the creation of hybrid applications that include Notes services. This further reinforces the value proposition of System i as a fully integrated platform for the mid market.

**Taking Steps to make this a Reality**

The points of integration we have described are real and immediate. IBM and Lotus are being presented with new requirements which have the potential to create vast new opportunities for Notes and the rest of the Lotus software portfolio. Here are some of these requirements and the steps being taken to meet them.

## 1. JDBC Driver for Notes

Lotus Software Products	Staged Data	Direct ODBC	Direct JDBC
Lotus Notes / Domino	✓	✓	✓
Lotus Sametime	✓	✓	✓
Lotus Quickr	✓	✓	✓
Lotus Connections	✓	✓	✓
Lotus Foundations	✓	✓	✓
'Project Atlantic'	✓	✓	✓
WebSphere Portal	✓	✓	✓
<b>Hardware Platforms</b>	✓	✓	✓
Intel / Windows	✓	✓	✓
Linux / AIX	✓	✓	✓
iSeries	✓	✓	✓
System z	✓	✓	✓

Real-time connectivity to Notes from external systems is currently provided by the NotesSQL ODBC driver provided by Lotus. Since ODBC is limited to the Windows platform, this severely limits the software platforms from which Notes data can be accessed. The ODBC requirement effectively locks out Systems z, i and p, as well as Linux (Lotus Foundations), from participating in and benefiting from Collaborative BI. This has been recognized as a severe limitation by IBM Server Group, Information Management and, of course, Lotus. Sun & Son has been working with IBM to specify the functionality for the new JDBC driver for Notes. We expect development to begin early in 2009 and for the

driver to be available in mid year. The JDBC driver will remove the one critical connectivity gap between Notes and enterprise systems.

## 2. Notes Integration with Data Cloud Architecture

Lotus Notes and the S&S Data Modeler for Notes are now integral parts of the IBM Data Cloud Architecture. They provide support for Notes semi-structured data along with the structured data in the data warehouse and business intelligence services. The Data Cloud is the first step towards a fully integrated IBM cloud offering and will serve as the base platform upon which IBM will build richer Cloud services. The Data Cloud is now being deployed internally at IBM and will be made available to customers later in 2009.

## 3. Full SOA Integration for Notes

Although the Domino Designer does allow developers to publish data as web services, Lotus participation in SOA initiatives has been very limited to date. Notes is not currently part of the IBM SOA Reference Architecture and effectively falls out of IBM SOA initiatives. This has been recognized as limiting factor in the adoption and integration of Notes in the Enterprise. Lotus is currently taking steps to more fully support SOA architectures and to be fully certified as part of the IBM SOA Reference Architecture.

## 4. Virtualization of Domino Services

The growing importance of Cloud Computing has highlighted the need to support the virtualization of Domino servers. Cloud Computing demands high scalability and responsiveness to varying loads. Historically, the Domino server architecture has been limited in this area. The lack of scalability has been a significant reason for customers moving Notes applications to other platforms. Lotus' one effort in the Cloud Computing area, Bluehouse, is limited to online collaboration and does not support Notes data nor does it address these larger scalability issues. Lotus is now aware of the need for a much more highly scalable and virtualizable Domino environment. We look forward to concrete developments in this area over the next several years.

## 5. Metadata Services in the Domino Design Environment

As we have described, metadata services for Notes enable enterprise integration for Notes in new and compelling areas. As Lotus steps up to addressing the challenges we have outlined here, it makes compelling sense for Lotus to integrate metadata services into the core Domino Designer environment. Sun & Son is working with Lotus, Information Management and the Server Group to develop an integration strategy.

## Summary

The challenges and opportunities presented by Cloud Computing highlight the pressing need for a quantum leap in enterprise connectivity for Lotus Notes. Notes metadata services provided by Sun & Son and the Data Modeler for Notes facilitate this integration. To fully realize the business value of semi-structured data in the enterprise, Lotus will need to make architectural changes to the

Notes platform to more seamlessly integrate with other IBM software platforms and Service Oriented Architectures. This transformation offers enormous new opportunities to Lotus and IBM overall.

