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# Lotus Software Domino 7 with DB2

## ***The best of both worlds – Part 1 of 2***

**Lotus** software

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# Objectives

- Session 1
  - ▶ Describe the deployment options and basic functionality of Domino/DB2 integration
  - ▶ Describe the value of combining Domino and DB2
  - ▶ Deploy DB2 Access for Domino
- Session 2
  - ▶ Understand DB2 Access Views and Query Views
  - ▶ Describe how Domino data is stored in DB2

## Agenda

- Value of Domino with DB2
  - ▶ Why implementation is good for DB2 and Domino customers
- Understanding Domino and DB2 configuration options
  - ▶ From single machine to complex network
- Enabling DB2 Access

## NSFDB2 Goals

- **Limited Availability**
  - ▶ Win32
  - ▶ AIX
- **Functional transparency**
- **Simple Administration Tools to setup NSFDB2 databases**
- **New features**
  - ▶ DB2 Access Views (DAV)
  - ▶ Query Views

## Benefits Domino with DB2 – Domino Customers

Data storage	Can be managed using DB2 tools
Open source	DB2 Access Views allow users to build J2EE applications
Administration costs	DB2 Administrators can handle backup/recovery
Data access	DB2 Access Views and Query Views can be used to develop applications with data from Domino databases as well as DB2 databases
Application integration	WebSphere MQ, IMS and CICS can be leveraged. DB2 Information Integrator's federated data capabilities can integrate data in other systems (like Oracle and SQL Server) with their Domino applications.
Performance	DB with large number of Views and indexing can be improved with DB2  NSF is still the high performance storage option for many Domino applications including email



## Benefits Domino with DB2 – DB2 Customers

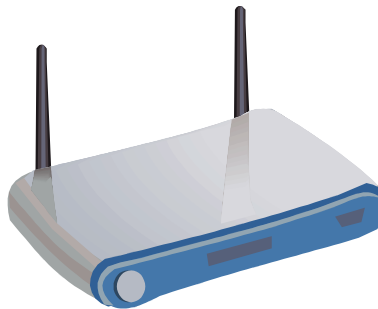
Security	Domino security is still used when the data is stored in DB2.
Collaboration	Customers can build collaborative applications with Notes/DB2 data. And (with IBM's data middleware tools) - Oracle and SQL Server.
DAV and DB2 Query Views	applications can be developed with data from Domino databases as well as DB2 databases using the Domino Designer client.

## Database Options

- DB2 as an alternate storage for Domino data
  - ▶ Not a replacement for NSF
  - ▶ One Domino server can manage Notes databases as both NSF and in DB2 – transparent to user



Domino  
Server



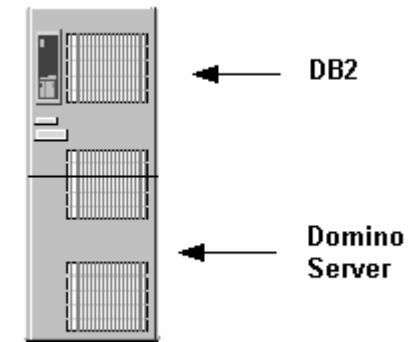
DB2



NSF

## Supported Configuration – the simplest approach

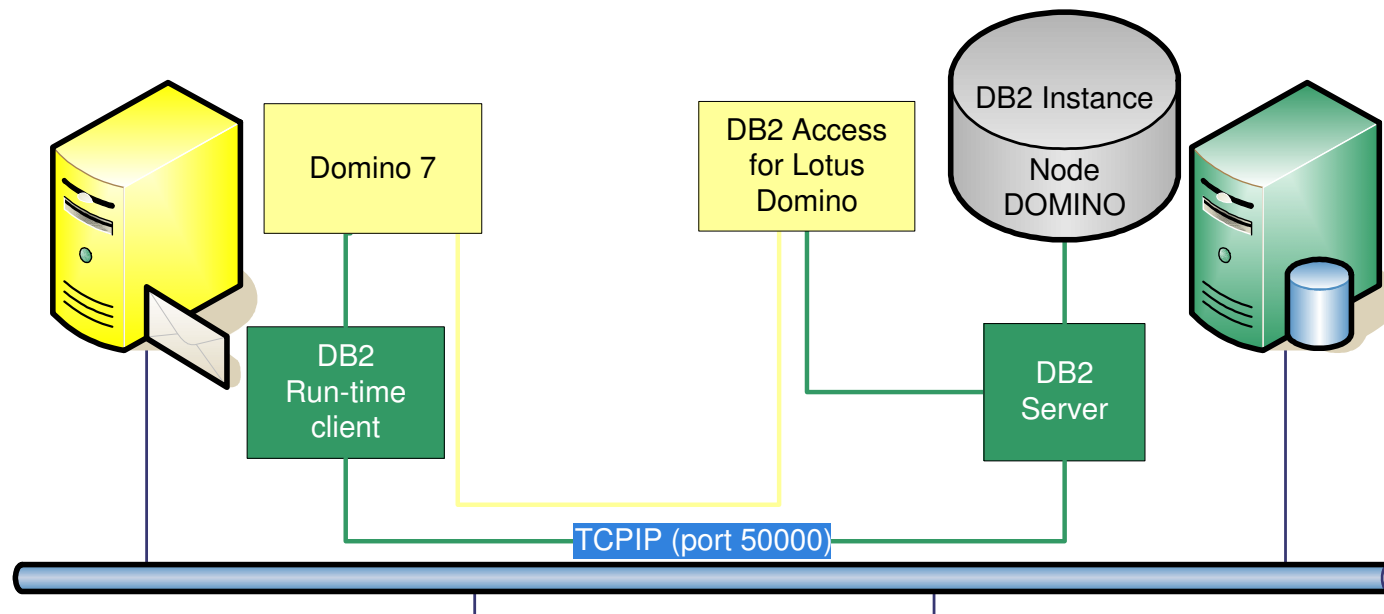
- **Domino and DB2 on the same machine**
  - ▶ Simpler implementation
    - Demo
    - Lab
    - Proof of concept
  - ▶ No other DB2 implementation is available
  - ▶ Server resources will cope with the combined load
  - ▶ Limited scalability



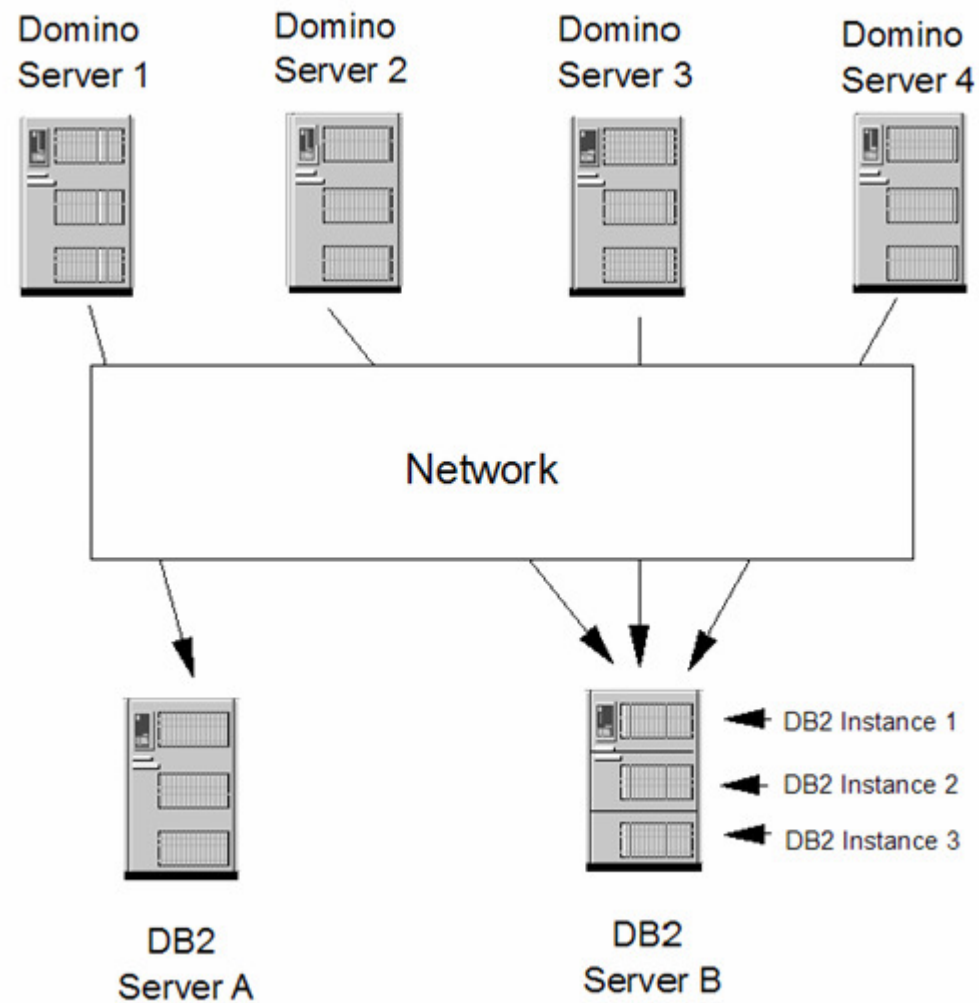


## More Robust Configuration

- Domino and DB2 server(s) located on dedicated machines (Win2K or AIX images)
  - ▶ Might be logical partitions on the same physical machine
  - ▶ Not just a 1-to-1 mapping



## More Complexity



## Other Platforms (Post Domino 7)



IBM iSeries



zSeries will be supported later

## Databases not supported in DB2

## NSF

ACTIVITY.NSF  
ADMIN4.NSF  
BILLING.NSF  
BUSYTIME.NSF  
CATALOG.NSF  
CLDBDIR.NSF  
DOMCHANGE.NSF  
DBDIRMAN.NSF  
DDM.NSF  
DIRCAT.NSF  
DOMCHANGE.NSF  
EVENTS4.NSF  
ISPY50.NSF  
LOG.NSF  
MAIL.BOX  
MAIL\*.BOX  
NAMES.NSF  
RESRC7.NSF  
SCHEMA.NSF  
STAREF.NSF  
WEB.NSF  
WEBADMIN.NSF

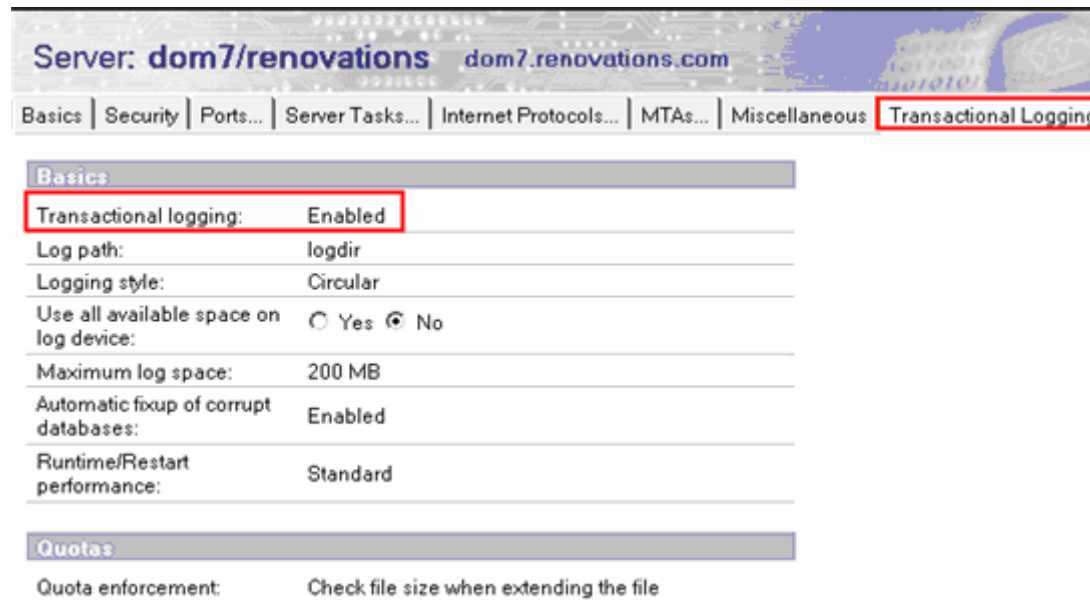
## From template

ACTIVITY.NTF  
ADMIN4.NTF  
BILLING.NTF  
CLUBUSY.NTF  
CLDBDIR4.NTF  
  
DBDIRMAN.NTF  
DDM.NTF  
DIRCAT5.NTF  
  
EVENTS4.NTF  
  
LOG.NTF  
  
PUBNAMES.NTF  
RESRC7.NTF

## Overview of the DB2 Access Enabling Process

- Enable Transaction Logging
- Register a DB2 Access Server
- Installing DB2 Access for Lotus Domino software
- Copy the Limited Availability key to the Domino install folder
- Enable the server to access DB2

## Enable Transaction Logging

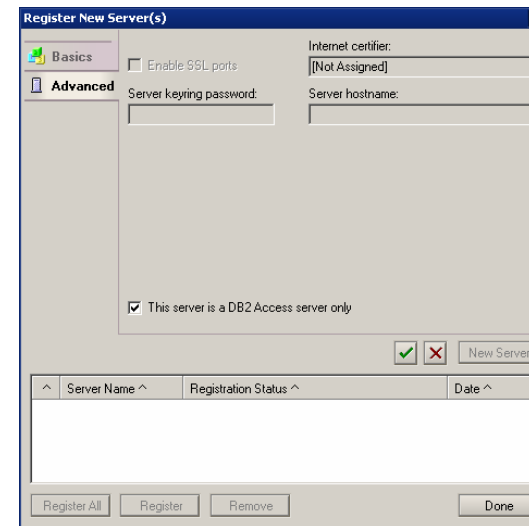
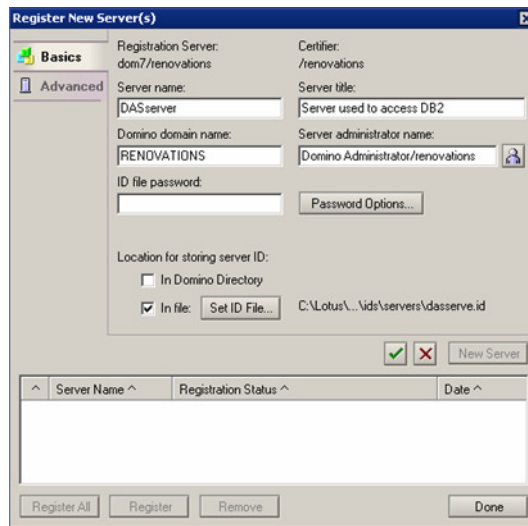


The screenshot shows the 'Server: dom7/renovations' configuration page. The 'Transactional Logging' tab is selected and highlighted with a red box. Under the 'Basics' section, the 'Transactional logging:' setting is set to 'Enabled' and is also highlighted with a red box. Other settings include 'Log path: logdir', 'Logging style: Circular', 'Use all available space on log device: No' (selected), 'Maximum log space: 200 MB', 'Automatic fixup of corrupt databases: Enabled', and 'Runtime/Restart performance: Standard'. The 'Quotas' section shows 'Quota enforcement: Check file size when extending the file'.

Server: dom7/renovations dom7.renovations.com	
Basics   Security   Ports...   Server Tasks...   Internet Protocols...   MTAs...   Miscellaneous   <b>Transactional Logging</b>	
<b>Basics</b>	
Transactional logging:	Enabled
Log path:	logdir
Logging style:	Circular
Use all available space on log device:	<input type="radio"/> Yes <input checked="" type="radio"/> No
Maximum log space:	200 MB
Automatic fixup of corrupt databases:	Enabled
Runtime/Restart performance:	Standard
<b>Quotas</b>	
Quota enforcement:	Check file size when extending the file

Transaction logging captures all the changes made to a database and writes them to a transaction log. The logged transactions are then written to disk in a batch, either when resources are available or when scheduled.

## Register a Domino Data Access Server



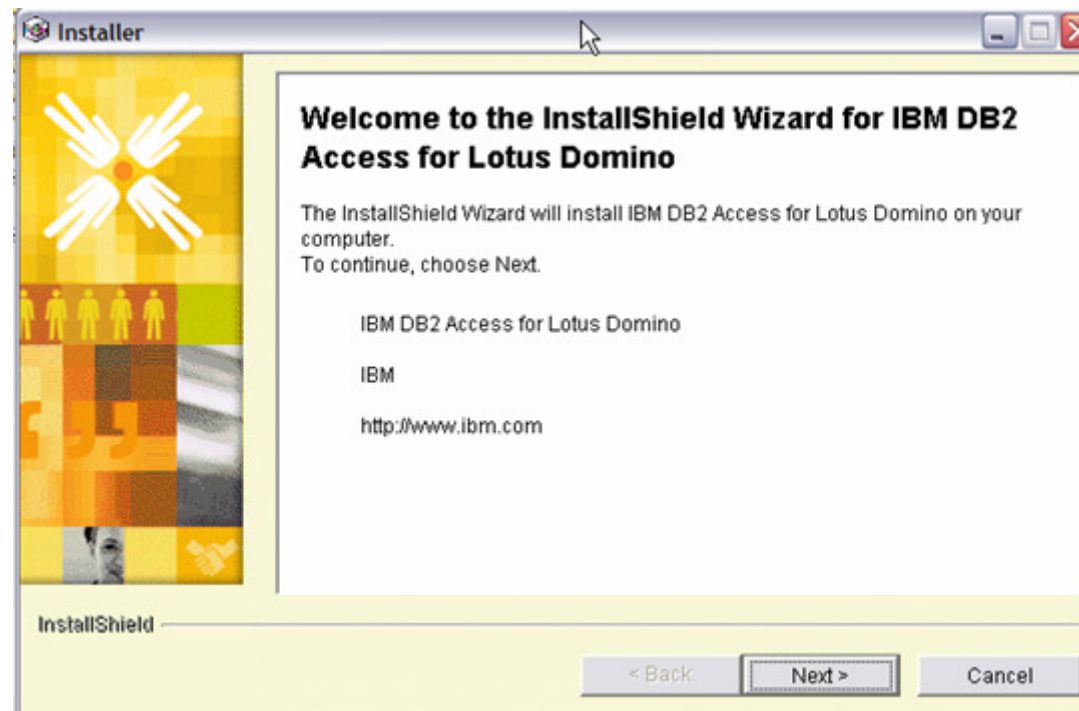
You need to register a server and create a new server ID  
To be used by the DB2 Data Access for Lotus Domino server.

## Limited Availability Key

- Go to <http://www.ibm.com/lotus/nsfdb2> for more information about the Limited Availability program
- To enable Domino 7 with DB2
  - ▶ use the "DB2 key" that allows access to Domino 7 with DB2.
    - For Microsoft Windows platforms, use NDB2KEY.DLL
    - for IBM AIX platforms, use libdb2key\_r.a.
- Add the Limited Availability key to the Domino Program directory

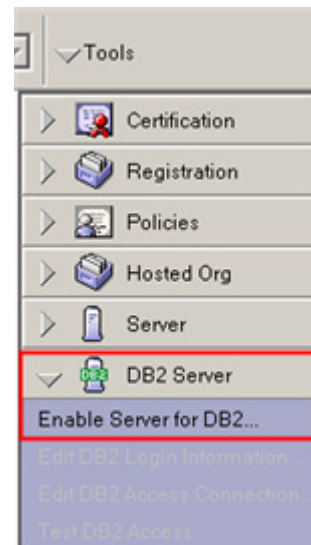


## Install DB2 Data Access Server



- A component that is installed on the DB2 server itself
- Acts as an extension to DB2 which enforces Domino database security (such as ACLs and reader lists) for DB2-enabled data
- Required when using DB2 Access Views

## Enable Server for DB2



Use the DB2 Server Enablement Tool, available from the Domino Administrator client, to automatically enable Domino to access a DB2 server.

# Summary

- This session discussed:
  - ▶ Value of integrating Domino and DB2
  - ▶ Domino/DB2 deployment options
  - ▶ Deploy process for DB2 Access for Domino

Session 2 will further the discussion by describing what can be done with DB2 data and the interaction between Domino and DB2.



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## Objectives

This session describes:

- How to use the some details about the data. You will see how to work with the data, how the data flows, and some administration tasks to help manage the Domino/DB2 environment.

## Agenda

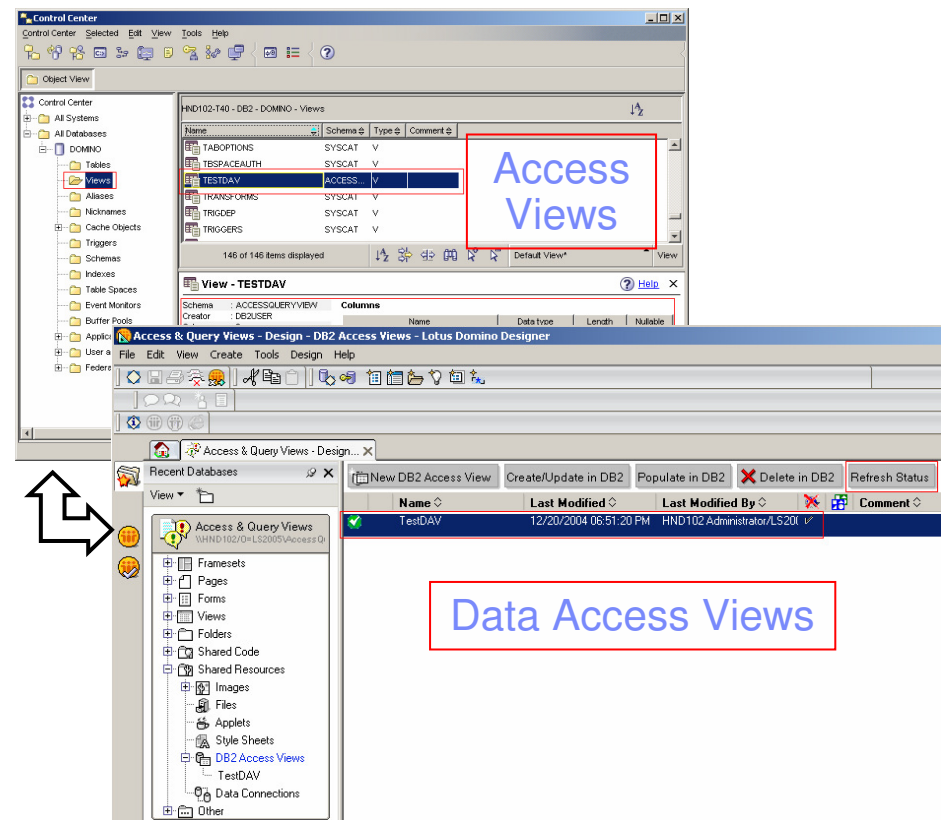
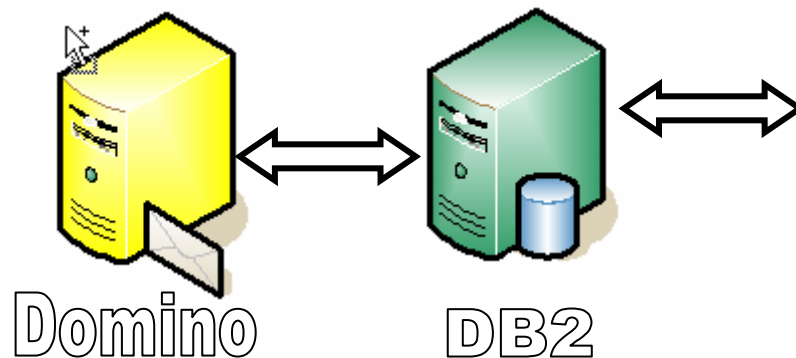
- Working with views in Domino and DB2
  - ▶ DB2 Access View
  - ▶ DB Query View
- How data is exchanged with DB2
- Overall Architecture
- How Domino manages DB2 tables
- Discuss high level DB2 administrative tasks

## What is a DB2 Access View (DAV) ?

- Design element in Domino database that defines a DB2 view of a set of Notes data in DB2
- Resolves difference between Domino's unstructured data and DB2's structured tables
- Makes data available via standard SQL queries
- Allows ODBC/JDBC clients to access the data directly from DB2
- Respects Domino security mechanisms
- Requires a mapping from Domino person document to DB2 user ID
- Required by DB2 query views that reference Domino data in DB2

## DB2 Access View

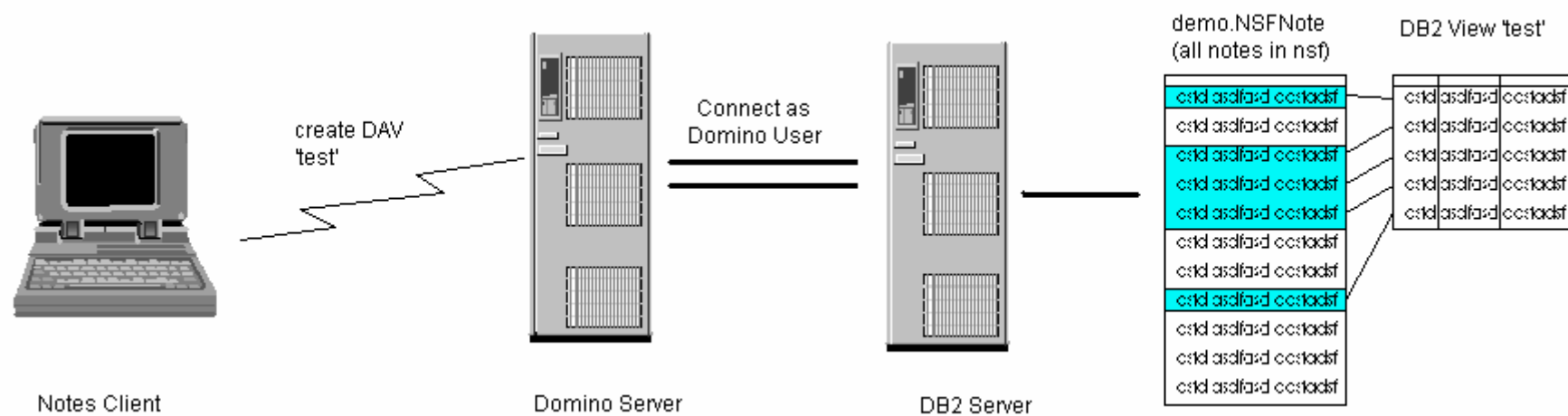
- User defined DB2 views which allow SQL access to and manipulation of related sets of Domino data





## DB2 Access View

Create a DAV in Domino Designer that instructs Domino to create a DB2 view

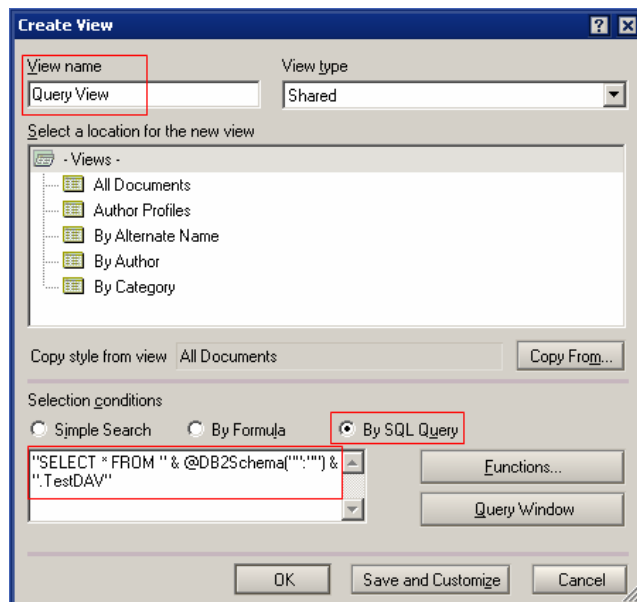


## What is a DB2 Query View ?

- Allows Notes applications to access data in DB2
- A Domino view populated via SQL query rather than view selection formula
- Can be composed dynamically in the Notes application e.g. prompt user for input and re-execute different SQL
- Can JOIN data from multiple DB2 tables/views; therefore, an application designer can join data from two NSF's indirectly by joining two separate DB2 Access Views
- Are not stored as part of the NSF
- Must reference some Domino data, otherwise you can not "open" the document in the view

## DB2 Query View

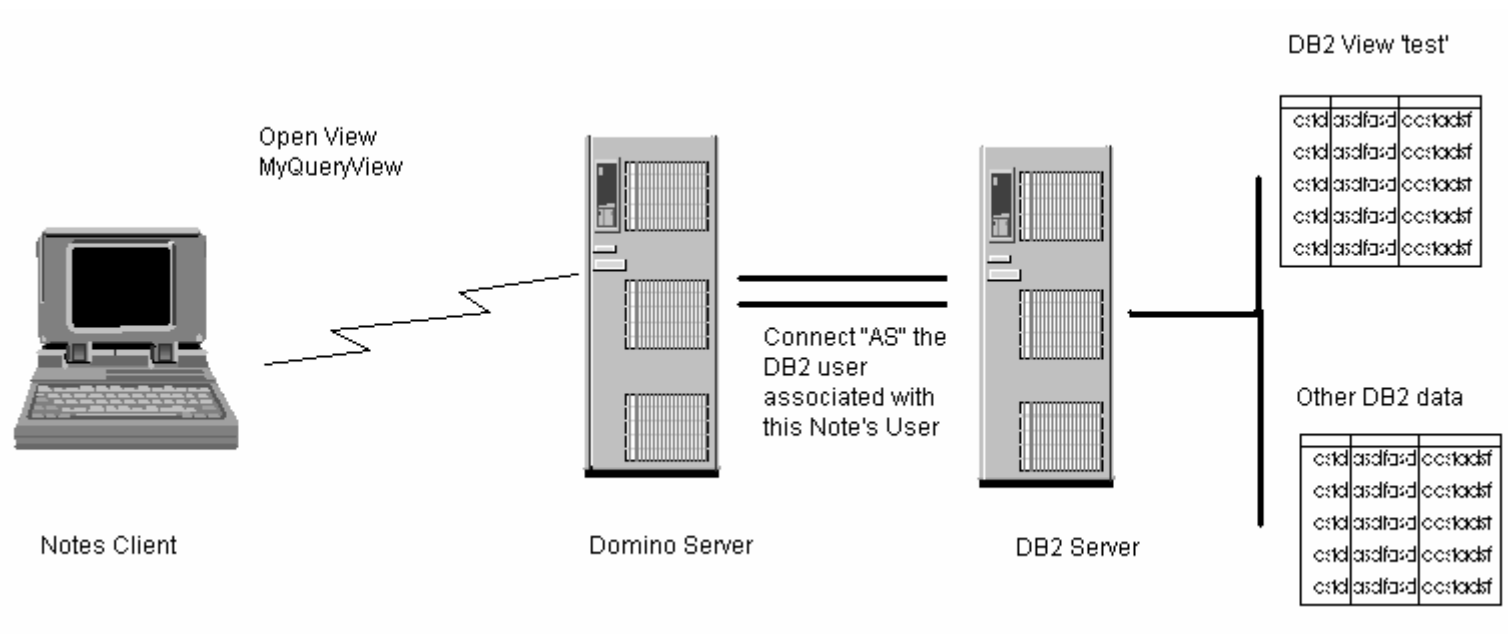
- Allow Notes apps to create a Notes view based on a SQL query
- Query Views are dynamic, the query runs in response to a view open or view rebuild



New View					
Name	Alias	Last Modified	Last Modified By		
(\$Profiles)	(\$Profiles)	11/02/2004 09:17:56 AM	Lotus Notes Template Develk	✓	✓
(Default View)	(Default View)	11/02/2004 09:17:56 AM	Lotus Notes Template Develk	✓	✓
(FlatCategory)	FlatCategory	11/02/2004 09:18:07 AM	Lotus Notes Template Develk	✓	✓
(LookupAuthorProfiles)	LookupPersonalPro	11/02/2004 09:18:00 AM	Lotus Notes Template Develk	✓	✓
(LookupInterestProfiles)	LookupInterestProfil	11/02/2004 09:18:03 AM	Lotus Notes Template Develk	✓	✓
(ProfileThreads)	ProfileThreads	11/02/2004 09:18:04 AM	Lotus Notes Template Develk	✓	✓
(Threads)		11/02/2004 09:18:00 AM	Lotus Notes Template Develk	✓	✓
★ All Documents	(\$All)	11/02/2004 09:17:56 AM	Lotus Notes Template Develk	✓	✓
Author Profiles	PersonalProfiles	11/02/2004 09:18:00 AM	Lotus Notes Template Develk	✓	✓
By Alternate Name	By Alternate Name	11/02/2004 09:18:03 AM	Lotus Notes Template Develk	✓	✓
By Author	AuthorView	11/02/2004 09:17:55 AM	Lotus Notes Template Develk	✓	✓
By Category	By Category	11/02/2004 09:17:56 AM	Lotus Notes Template Develk	✓	✓
Query View		12/20/2004 07:18:54 PM	HND102 Administrator/LS200	✓	✓

## DB2 Query View

- A Query can be composed dynamically in the Notes client application, for example, by using the @prompt function. The application can prompt the user for STATE and then query only the people who live in the selected state.
- A Query View can join data from multiple DB2 tables and views; therefore, you can join data from two NSF's by joining two separate DB2 Access Views.



Benefit: Using DB2 to access data means that Query Views are dynamic

## Key Domino/DB2 Features

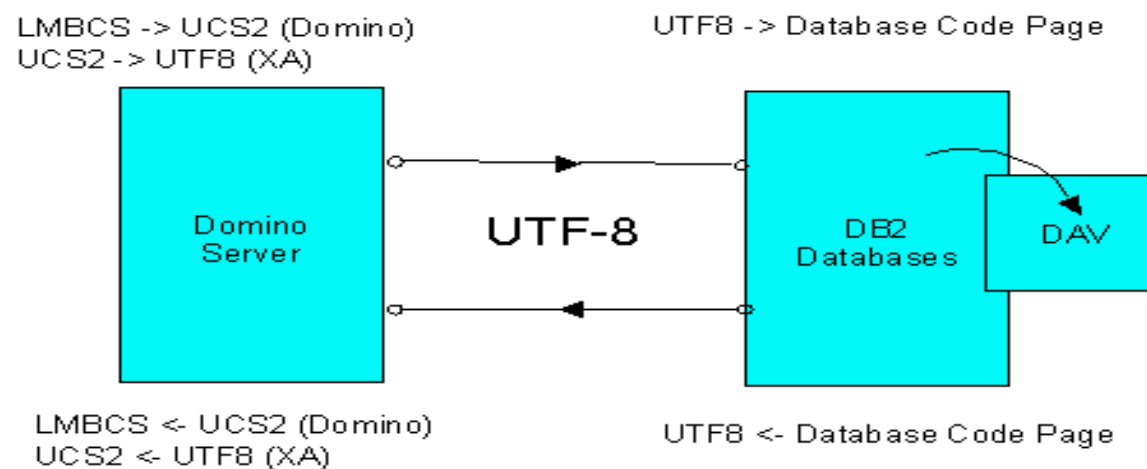
- Domino with DB2 supports Domino security
- Any version of the Notes client that has access to the Domino server can access the Domino databases stored in DB2.
- Save memory in the Unified Buffer Manager (UBM) pools when NSF databases are moved into DB2.
  - ▶ By default, Domino uses 1/8 to 3/8 of available memory.
  - Use this NOTES.INI variable with the recommended value of 25:  
**NSF\_BUFFER\_POOL\_SIZE\_MB=25**

# How Data Is Transferred To and From DB2

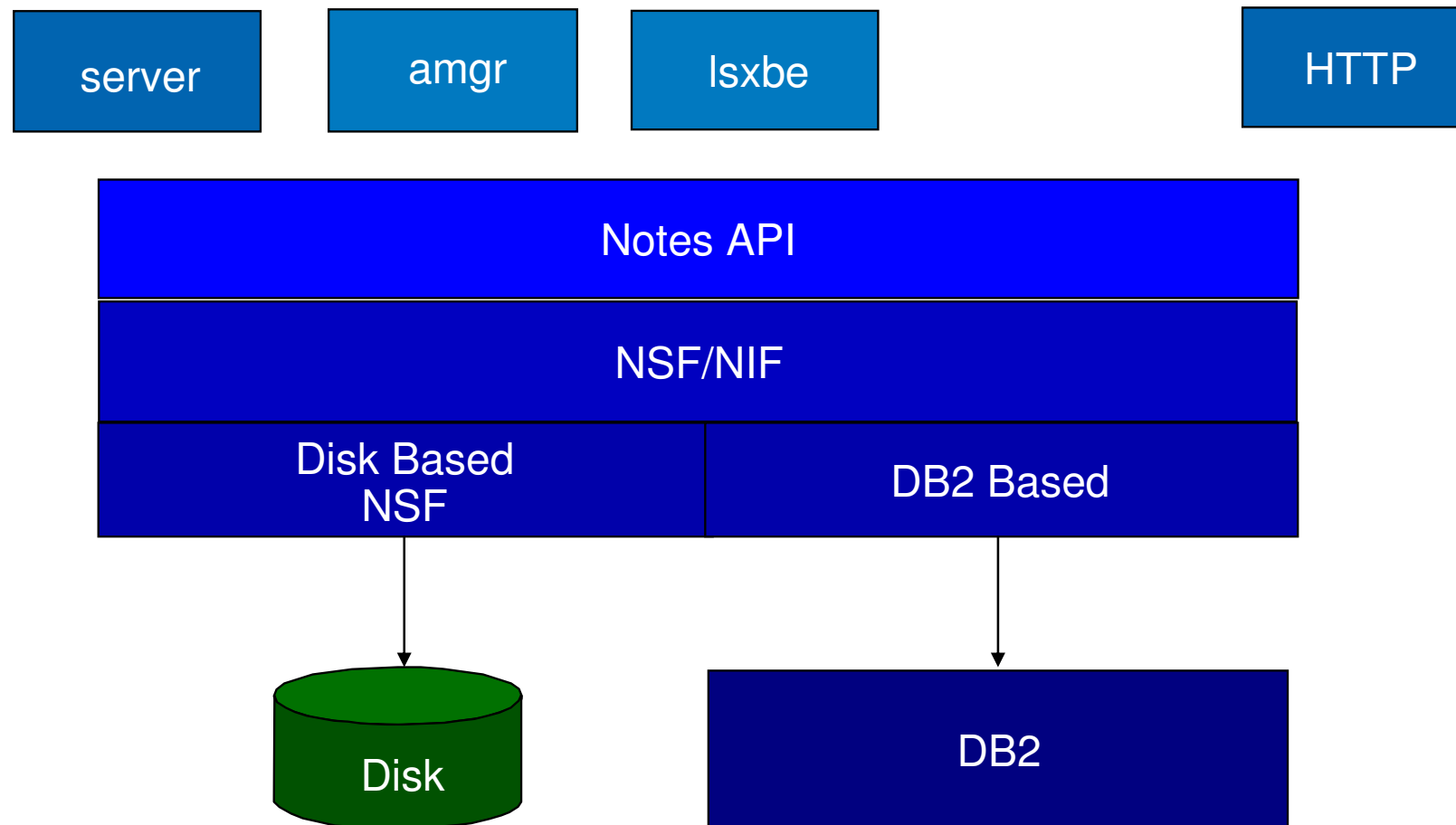
- Two kinds of data
  - ▶ Graphics data (BLOB) - most of the Domino data
  - ▶ Character data - translated into UNICODE for transmission
    - path name
    - object name
    - design element names
- Most Domino data are in LMBCS and are treated as graphics data. No translation is needed in the process

## How Character Data Is Transferred to and from DB2

### Internal Translation for Character Data



## Overall Architecture





## Architecture

- Maintains API level compatibility
- Full compatibility with Domino functionalities
  - ▶ replication
  - ▶ server
  - ▶ backend classes
  - ▶ etc...
- All your applications work without modification
- Implemented at a very low level
- Generates SQL to update or retrieve result sets from tables in DB2

## How Domino Manages DB2 Tables

- Catalog in DB2 - a master catalog in DB2 is used to track the mapping between nsf and the DB2 schema and table space
- Data portion of nsf is split into separate tables
  - ▶ NSFNote - individual notes
  - ▶ NSFData - additional information about individual notes
  - ▶ NSFObject - objects (e.g. attachments)
  - ▶ NSFObjNam - named object lookup table
  - ▶ Properties - misc. name value pairs
- View portion of nsf is translated into DB2 indices
  - ▶ One NIFCtl table and several NIFData tables
- DB2 access views
  - ▶ DB2Map - table to track DB2 access view entities

## Domino Data in DB2

### Domino.catalog (table)

FILEPATH	NSFSCHEMA	TABLESPACE
expense.nsf	EXPENSE	EXPENSE
mail\mymail.nsf	MYMAIL	MYMAIL
Dev\Spec.nsf	SPEC	SPEC

### EXPENSE (schema)

EXPENSE.NsfNote  
EXPENSE.NsfObject  
EXPENSE.NsfObjNam  
etc...

### SPEC (schema)

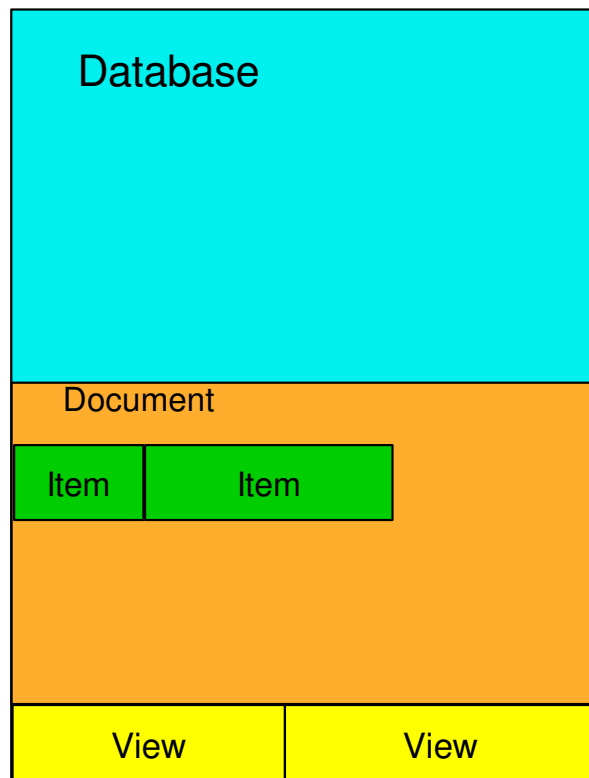
SPEC.NsfNote  
SPEC.NsfObject  
SPEC.NsfObjNam  
etc...

### MYMAIL (schema)

MYMAIL.NsfNote  
MYMAIL.NsfObject  
MYMAIL.NsfObjNam  
etc...

## Mapping Domino and DB2 Objects

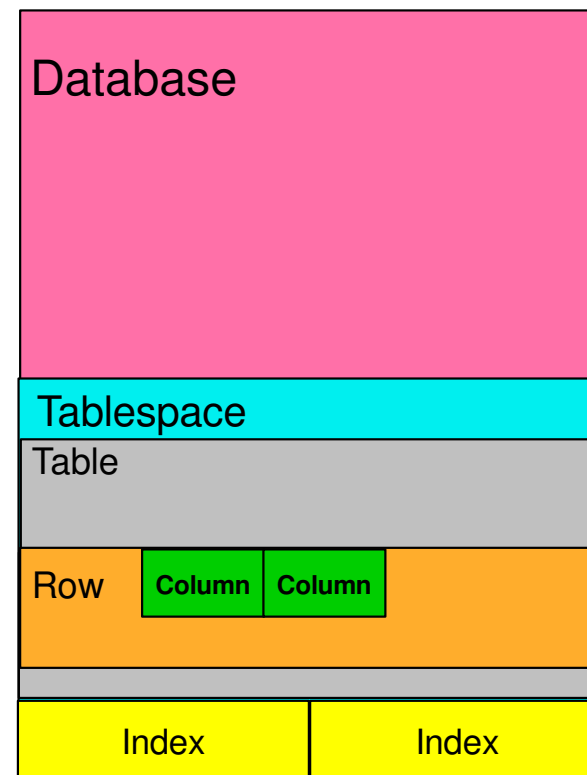
### Domino



"Natural  
mapping"

color  
coded

### DB2



## High Level Domino/DB2 Administration

- Who will perform Admin duties?
  - ▶ Combine teams
    - If you have RDBMS admins, may be easiest for them to "cross over"
    - Domino admins complement the knowledgebase
- Gain expertise among Domino Administrators
  - ▶ Domino to RDMBS transition can be gradual
  - ▶ Relational concepts are applicable to native Domino

## Key Points

- Domino in DB2 is a major server enhancement
  - ▶ By storing Domino data in DB2,
    - Relational capabilities for Domino and SQL applications can be exploited
    - Opportunity for server consolidation
    - Many more possibilities
  - ▶ Affects how you
    - Administer your server
    - Enhance existing and develop new applications

# Questions