Lotusphere 2010

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BP203
Leverage the New Java APIs in IBM® Lotus Notes® 8.5.1!

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lotusknows.com

Agenda

- Introduction
- Extending Lotus Notes in Java
- Added value for classic Lotus Notes
- Extending Domino Designer in Java
- Best practices
- Q&A

About us

- Mindoo is IBM Business Partner and Notes/Domino Design Partner
- Focused on the „new“ IBM Lotus Notes development areas
  - Eclipse/Expeditor plugins and rich client applications
  - Composite Application architectures
  - LiveText extensions
  - Xpages applications
- Karsten Lehmann and Tammo Riedinger
  - Founders of Mindoo
  - Since 2004 developers of the MindPlan® application,
    Mindmapping and Project Management for Lotus Notes, IBM Award Winner 2008
- More company information:
  http://www.mindoo.com

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Mindoo GmbH

Motivation

- „Notes can do that too“ - yes, but why must it be so complicated?
  - Until now, Eclipse developers had to use far too many workarounds to interact with the classic Notes UI
  - Think of “using Notes.ini for data exchange” or “opening pages that close themselves, just to run some LotusScript® code in the QueryClose event”
  - The purpose of the new APIs is to make this gap a little smaller and life quite a bit easier
- We participated in the discussion about required features for the new Notes and Designer extensibility APIs
  - Discussion with IBM dev about API draft at Lotusphere 2009 and conference calls
  - Design feedback / test reports within the Design Partner program
- As always for a first release, there is still room for improvements
  - But we think this is already a **huge step** forward!

Disclaimer

- The presented Java APIs do not work in Notes agents. This is pure Eclipse stuff!

- Don't leave yet, if you do pure LotusScript development. We also have something for you later on!

Disclaimer

- We cannot cover all APIs in detail in this session!
  - We'll focus on some "**hot**" areas instead:
    namely the new Java UI APIs and the Designer Java-API
  - See BP209 and AD103 for two one hour sessions about each API
- We hope to give you a good impression, what you can really do with the Notes 8.5.1 APIs.
  - Hopefully you will leave this session with some ideas of your own already
  - We have created up to 10 demos for you!
- We try not to bore you to death with code today!
- Watch our blog for an upcoming series with details about how our demos work instead:
  http://blog.mindoo.com

Getting started

- The following APIs and demos are based on
  - Eclipse 3.4.2
  - Expeditor toolkit 6.2.1
  - IBM Lotus Notes 8.5.1
- Install Expeditor into Eclipse and set Lotus Notes 8.5.1 as target platform

- Create a plugin-in project to develop your code
- For the UI API, add the following dependency
  - com.ibm.notes.java.ui
- For the DDE API, add two dependencies:
  - com.ibm.designer.domino.ui.commons
  - com.ibm.designer.domino.ide.resources

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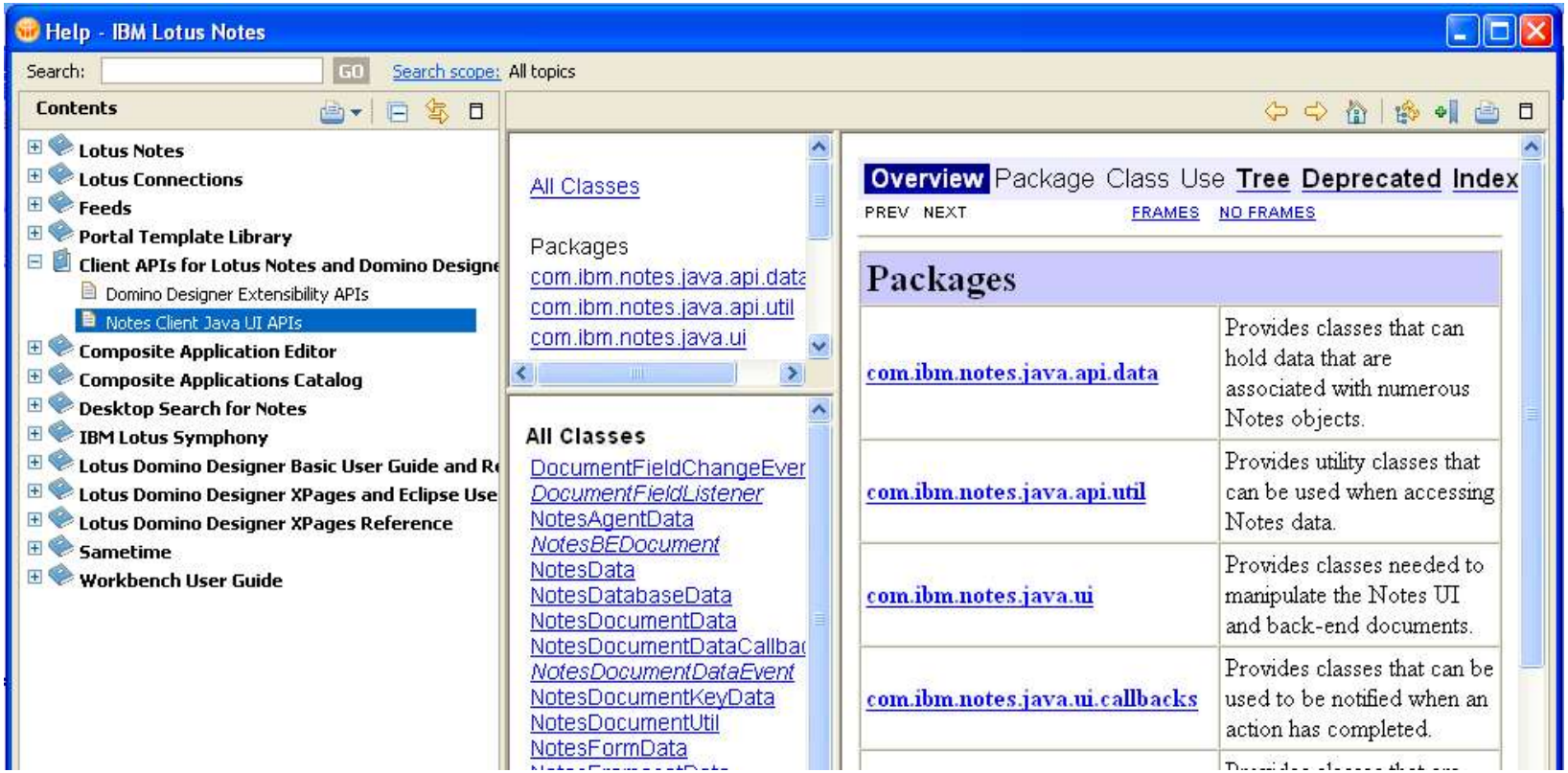
The Java UI API – a Management Summary

- API new in 8.5.1
  - Unsupported preview available in 8.5
- Further improves the integration between Eclipse and the classic Lotus Notes client
  - Eclipse plugins can finally receive information about the state of forms and views of the classic client
  - New ways of interaction between these two worlds
- Makes existing functionality easier to use
  - Opening of design elements
  - Printing documents and views from Eclipse
  - Compose a new document and fill it with default items
  - Getting a temporary document to store and pass data
  - Execute Notes code in a background thread with proper memory management (NotesSessionJob)

The Java UI API – a Management Summary

- Adds new functionality and further closes the gap between Eclipse and Lotus Notes
  - Read/modify contents of documents in edit mode
  - Document listener (detect edit mode on/off, modifications and document closing)
  - Get Eclipse selection for focused fields and new unsaved documents
  - Add database to workspace
  - Prompt methods of NotesUIWorkspace, e.g. to choose a database
  - Lots of Eclipse property testers (a kind of "hide when" for Eclipse elements like e.g. actions)
  - Execute LotusScript agents in the UI (they can display dialogs), pass data back and forth and attach callbacks

Where is the documentation?



Start small – Your first example

- Toolbar action that changes fields in an open form
- Add this to a standard Eclipse toolbar action:

```
NotesUIWorkspace ws = new NotesUIWorkspace();
NotesUIDocument uidoc = ws.getCurrentDocument();
if (uidoc != null) {
   NotesUIField field = uidoc.getField("Subject");
   if (field != null)
      field.setText("Hello World!");
}
```

Start small – Your first example

- For backend document fields:

```
NotesUIWorkspace ws = new NotesUIWorkspace();
NotesUIDocument uidoc = ws.getCurrentDocument();
if (uidoc != null) {
   NotesBEDocument beDoc = uidoc.getBEDocument();
   String oldValue = beDoc.getItemString("Flag");
   // do something here
   beDoc.setItemValue("Flag", "1");
   //optional to see your changes in the UI:
   uidoc.reload();
}
```

- Due to technical restrictions no full access to the document from Java

Demo

- Access and modify the UI document with Eclipse actions

Digging deeper - Exploring NotesUIWorkspace

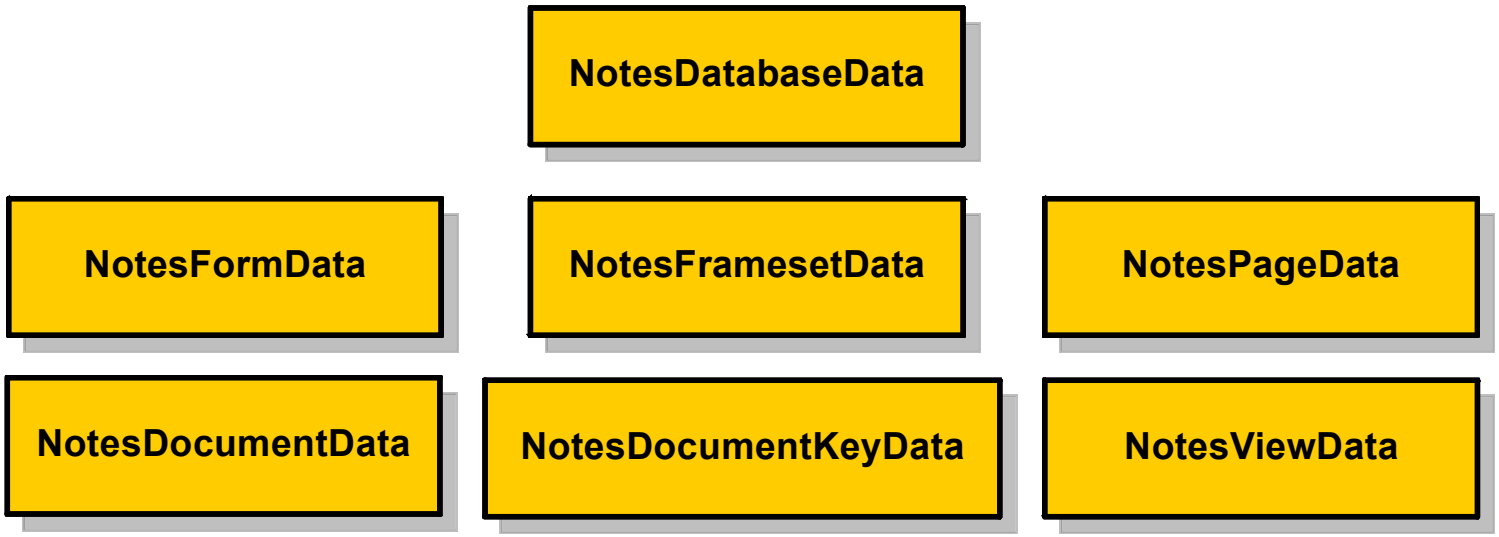
- Composing new documents with preset fields

```
NotesUIWorkspace ws = new NotesUIWorkspace();
NotesDatabaseData dbData =
   new NotesDatabaseData("Server/Org", "main/jdoe.nsf");
NotesFormData formData =
   new NotesFormData(dbData, "Memo");
formData.addComposeItem("SendTo", "Peter Smith/Org");

ws.composeDocument(formData);
```

Digging deeper - Exploring NotesUIWorkspace

- Data classes are used in the API to store data between Notes session
- You can safely pass them between calls to the API and store them locally
- sometimes, data (like the database's filepath) is missing
  - This is due to technical restrictions
  - Use the open-method to let Notes fill in the missing fields
  - e.g. NotesDatabaseData.open(Session)



Digging deeper - Exploring NotesUIWorkspace

- Add databases to the workspace

```
NotesUIWorkspace ws = new NotesUIWorkspace();
NotesDatabaseData dbData =
    new NotesDatabaseData("Server/Org", "path/db.nsf");
ws.addDatabase(dbData);
```

- If the database is already on the workspace, it gets focused

Demo

- Compose document demo

Digging deeper - Calling agents in the UI

- Until now, you could only execute LotusScript agents in the backend
  - No way to change the Notes UI from an agent
- This has changed in 8.5.1
  - New function to execute an agent in the Notes UI
  - E.g. to access the current document/view and display dialogs
  - Even run agents from a different database!
- Handy for functions that are not yet part of the UI API
  - Put your code in a Lotusscript agent
  - Call NotesUIWorkspace.runAgent
  - Use a callback listener to get notified when the agent is done
  - Pass data between Eclipse and LotusScript

Improved Eclipse selection

- In 8.5: Eclipse selection limited to selected documents in a view and already saved documents
  - Based mainly on passing around Notes-URLs
  - No access to "in-memory" documents
- In 8.5.1: get information about unsaved documents and even about focused fields
  - You can track what the user is editing
  - Introduction of classes that can be queried directly for more information than just the URL (e.g. NotesUIElement, NotesUIDocument and NotesUIField)
  - Uses standard Eclipse concept (adapters) to provide additional data!

Improved Eclipse selection

- Using IAdaptable on selections

```
// iterate over a selection and print the form-name
for(Iterator<?> i=((IStructuredSelection)
  selection).iterator(); i.hasNext(); ) {
   Object item=i.next();
   if (item instanceof IAdaptable) {
      NotesUIDocument doc=(NotesUIDocument)((IAdaptable)
        item).getAdapter(NotesUIDocument.class);

      if (doc!=null)
         System.out.println(doc.getForm());
   }
}
```

Demo

- Universal context-based online help system
- Calling agents from Eclipse and transfer data

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Limitations of the API

- Sounds great! But where is the catch?
  - We do not only want to show what's possible, but also what's not possible
- Only a small subset of the LotusScript API
  - New features will be added in future releases
- Event listeners not blocking form/view events
  - No replacement for LotusScript events, e.g. QuerySave
- Eclipse => classic Notes only
  - Does only empower the Eclipse world, no improvements for the classic client world

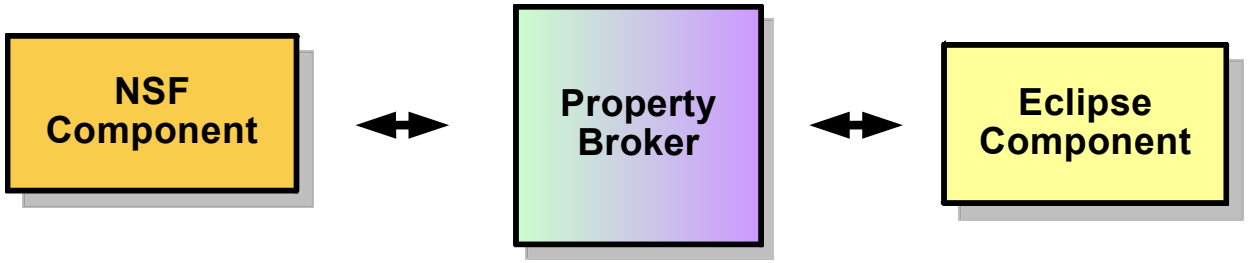
So how can we bring the classic client and Eclipse closer together?

- How can we leverage the Eclipse functions from LotusScript?
- Three possible solutions to access Eclipse from the Notes client

How to connect two worlds

Solution 1: The Property Broker

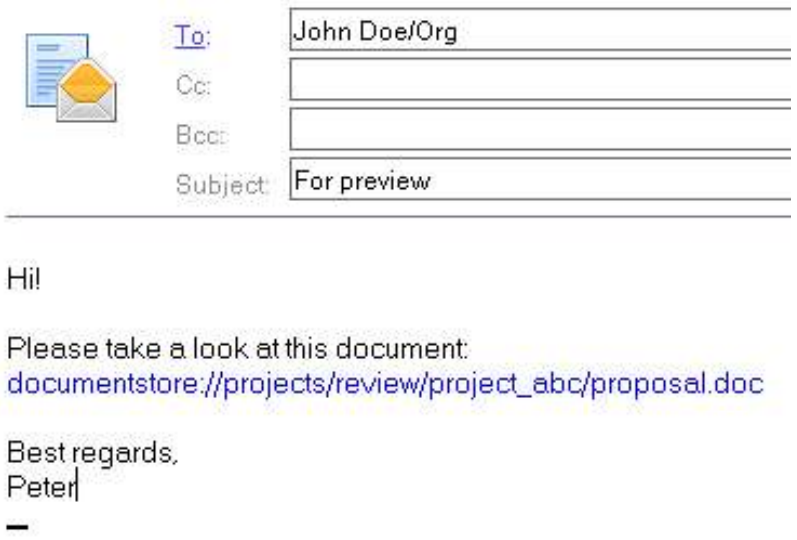
- Send a string from LotusScript to the Property Broker
- Eclipse plugin is registered at the Broker and receives the string
- Asynchronous solution
  - No direct anwer, only via Composite Application wire
- Does only work within a Composite Application



How to connect two worlds

Solution 2: Create your own URL handler

- Undocumented / unsupported feature since 8.5
- Register your own URL type myprotocol://
- Java handler is called whenever a URL should be opened
  - Works for NotesUIWorkspace.URLOpen, @UrlOpen, links in richtext and the address bar
  - Also interesting for other use cases
- Length of URL is limited
  - Call multiple times for more data
- Asynchronous solution
  - But works outside a Composite Application



Demo

- Custom URL handler in Lotus Notes

How to connect two worlds

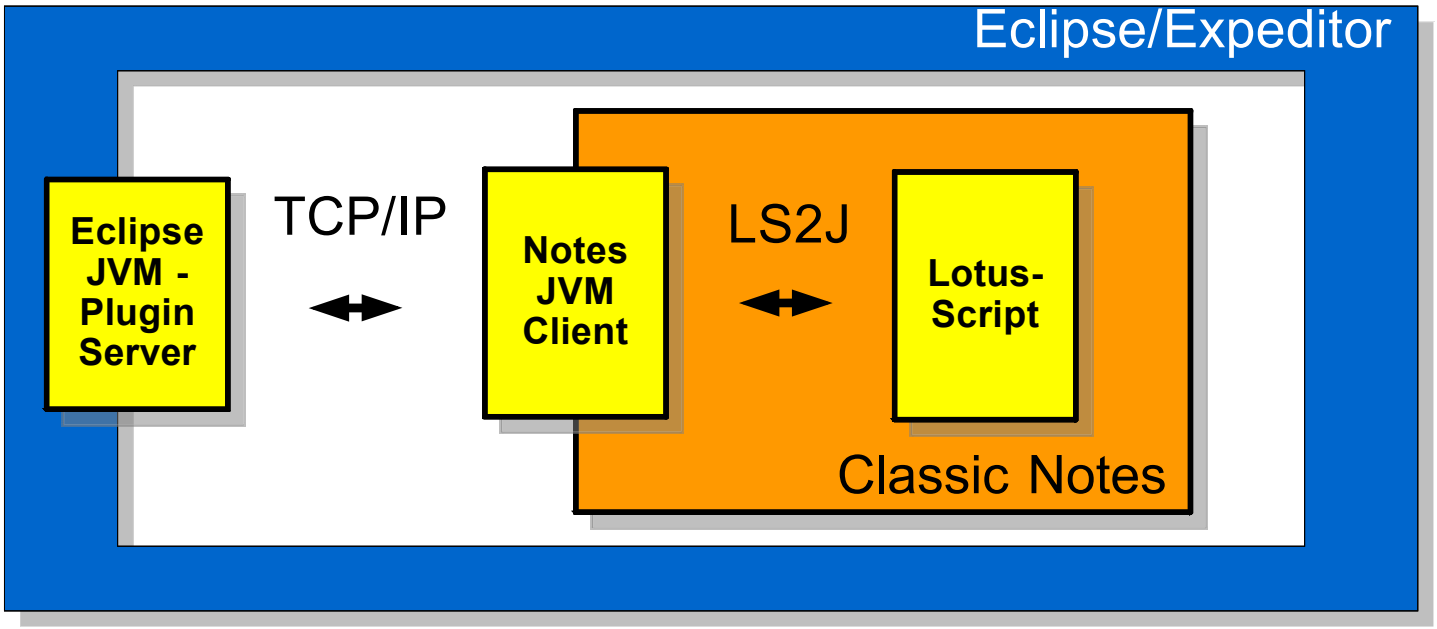
Solution 3: Build your own bridge!

- Two JVMs: Eclipse JVM and classic Notes JVM
  - No direct connection between Eclipse plugins and Notes agents
- Use local network communication between them
  - Open a server port in Eclipse, connect from the classic JVM
- Use your own protocol or industry standards like Java RMI
  - And remotely call Eclipse plugin code from classic Notes
- Optional: Use LS2J to use the remote Java API in LotusScript

How to connect two worlds

Solution 3: Build your own bridge!

- The result is pretty impressive
  - Combination of LotusScript and Eclipse plugins opens up new design patterns
  - E.g. background threads for long-running LotusScript code or creating Eclipse tabs and layouts from LotusScript on the fly



Demo

- Multithreaded LotusScript application
- LotusScript creating new Eclipse tab layouts on the fly (Eclipse Perspectives)

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Domino Designer Extensibility API

- The DDE API allows for programmatic Java extensions of the Domino Designer IDE
  - Main use cases:
  - React on the user selection -
    e.g. display additional data in your own display areas (Eclipse views)
  - Offer automated processing of data, e.g. set flags for all selected images
    or let code generators create the design
- Adds new functionality
  - Get design element information about the current Eclipse selection
  - Set basic design element and database data
  - Refresh the project/single design element after a backend change (e.g. DXL import)
  - Open databases in the DDE navigator
- Additional extensibility gained by leveraging the standard Eclipse APIs
  - An NSF project is an extended Eclipse IProject

Convert Eclipse selection into DDE API objects

- Convert Eclipse IProject into DesignerProject
  - An IProject is a generic development project in the Eclipse IDE

```
DesignerProject nsfProject =
   DesignerResource.getDesignerProject(iproject);
String dbServer = nsfProject.getServerName();
String dbPath = nsfProject.getDatabaseName();

//
//modify db design here, then notify DDE about changes
//
nsfProject.refresh();
```

Convert Eclipse selection into DDE API objects

- Convert Eclipse IResource into DesignerDesignElement
  - An IResource is a generic subelement of an Eclipse IProject

```
DesignerDesignElement de =
    DesignerResource.getDesignElement(iresource);
String oldName = de.getName();

//
//modify design element here, then notify DDE about changes
//
de.refresh();
```

Demo

- Custom properties for Notes design elements
- LotusScript.doc* integration into Domino Designer

*) Download of Lotusscript.doc V2 available at: http://blog.lsdoc.org

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General advice

- Learn to work with threads
  - Don't do long running operations in the UI thread!
  - This blocks the whole client!
  - Do calculations in background jobs, then use a UIJob to update the UI:

```
NotesSessionJob job = new NotesSessionJob("BG Operation") {
  protected IStatus runInNotesThread(
      Session session, IProgressMonitor monitor)
        throws NotesException {
      //compute something here
      return Status.OK_STATUS;
  }
};
job.schedule();
```

General advice

- Don't cache Notes objects
  - Can lead to severe memory issues
- The Notes Java API only has a limited amount of handles for data objects
  - And you are not alone in the client
  - Call .recycle() whenever possible
- Use NotesSessionJob for your Notes access
  - Executes in the background
  - Grabs a fresh session every time, safe even if the Notes ID has changed
  - Automatically recycles all the Notes objects created within the session
  - Copy the Notes data into your own objects
  - UI API data classes are safe (e.g. NotesDocumentData)

Summary

- Eclipse developers get additional ways to interact with Lotus Notes UI
  - Existing Lotusscript code can be reused by calling it in UI agents
  - Can be used for a smooth transition of Notes code to Java plugins
  - Room for improvements in the APIs: Missing classes/methods compared to Lotusscript
  - IBM dev should also work on the backend APIs (Notes.jar):
    e.g. improve parameter passing to backend agents, attachment streaming and other features
- Classic Lotus Notes development can also benefit from the new APIs
  - By building a bridge between LotusScript and Eclipse plugins, the API functions can also be used from classic forms and views
  - Interesting new design patterns like multithreaded LotusScript applications and Eclipse UI control
- DDE can now be extended as well
  - Leverage the design element selection to modify design, add code/design generators to DDE
- Conclusion: Notes is cool :-)

Thank you!

Time for Q&A

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