Deploying and Managing XPages Applications

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Before we get started

At the simplest level once you sign the database XPages will just work

What we're talking about is the best practice for improving

- Stability
- Performance
- Manageability (not sure that is a word!)

Really, this is all quite new. So don't be worried if it feels that way!

- We did too....

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Agenda

What are XPages?

Installing

Performance

Deploying

Security

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x-what? Do-who?

Hint to the admins here: You're going to find all sorts of new stuff today!

XPages - New tool for developing web and client applications

–Built using modern web techniques, separating data from UI

Code written in two kinds of Javascript

–Server Side JavaScript executes on your server (like agents)
–Client Side JavaScript executes in the client

Dojo - Framework downloaded to browser to run code locally (like iNotes does)

–Provides the common stuff (date/time picker etc)
–Stored on your Domino server and automagically downloaded to browsers
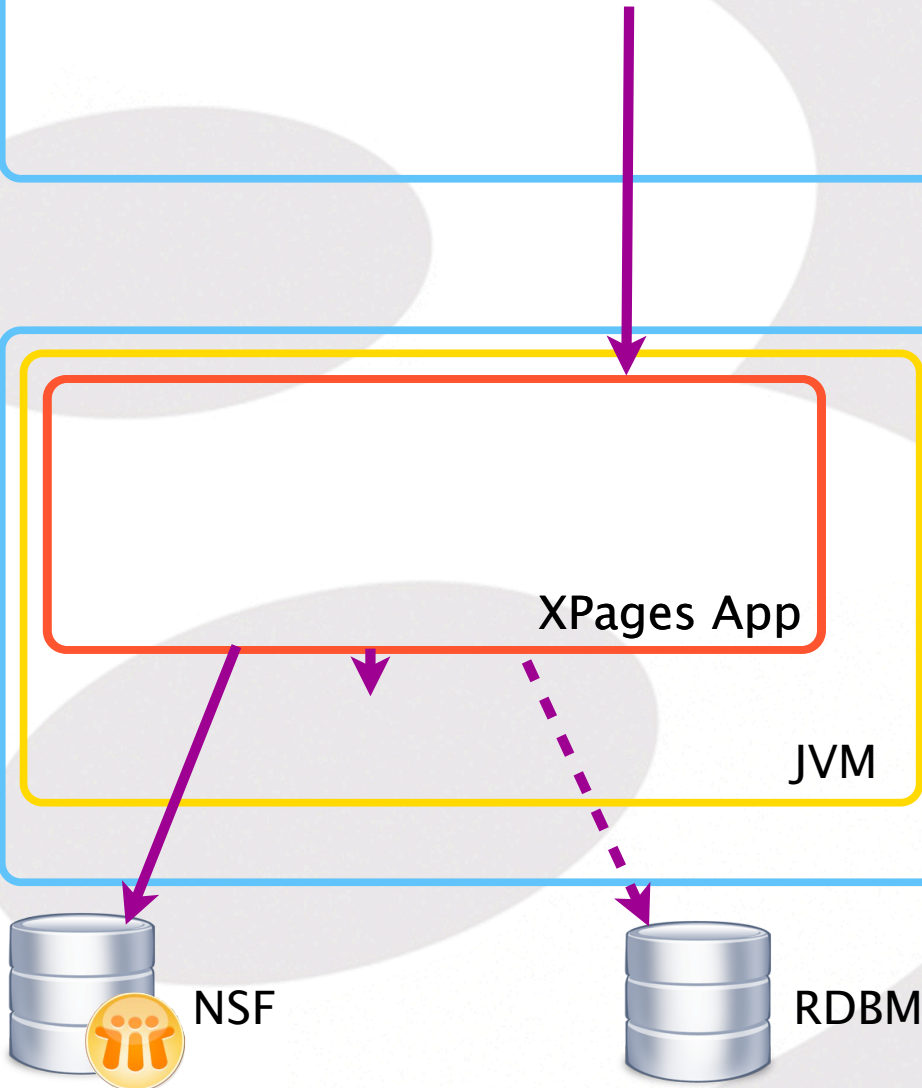
XPages

Browser

XPages App

JVM

HTTP Task

NSF

RDBMS

File System

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XPages Extension Library

The first question an Admin is likely to be asked

A set of server side javascript tools

Written by IBM and available for free on OpenNTF

– http://extlib.openntf.org

Provides developers a jump start to develop apps

– Such as a a grid function or UI

Warning! These are updated very, very frequently - monthly or weekly!

XPages in the client

Sometimes known as XPiNC

XPages runs in the client too

- Write once, run anywhere(ish!)
- Actually runs IN the client, using a local JVM
- Available from 8.5.1

If the Extension Library is used, it must also be in the client

- We'll talk about how to deploy these

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'Installing' XPages

XPages and Dojo parts are optional installs but installed by default

–So you very likely already have it!

Extension Library is not installed by default

Be careful when upgrading servers

–Remember to upgrade the extension library to match

–Functionality and code VARIES between point releases

–Upgrading randomly will (may) break apps!

–Admins - talk to your developers!

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Installing the Extension Library - Lotus® Domino® 8.5.2

This is effectively a manual installation - for EVERY server

- –go to http://extlib.openntf.org
- –make sure you download the 8.5.2 (not the 8.5.3) version

Extract updatesite.zip from the download and extract it

Copy to
c:\domino\data\domino\workspace\applications\eclipse

Restart HTTP

To verify the load, type
"tell http osgi ss com.ibm.xsp.extlib"

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Installing the Extension Library - Lotus Domino 8.5.3

Download the 8.5.3 version from OpenNTF

Domino server now supports installation from an update site too (cool eh?)

- Create an update site on *one* server using the "Eclipse Update Site (8.5.3)" template
- Extract updatesite.zip to a folder and import the Extension Library to the update site
- Important! The signer of the *update site documents* must have 'run unrestricted'
- Add "OSGI_HTTP_DYNAMIC_BUNDLES=updateSite1.nsf" to servers' notes.ini (hint: use a configuration document!)
- Restart HTTP
- To verify the load, type "tell http osgi ss com.ibm.xsp.extlib"

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Installing the Extension Library - Notes clients

Can be included in original installation package

–But this ties you to a certain version

Best maintained in an update site

–Can (should?) be the same one as the server uses

There are many ways to trigger this

–All documented in the Domino admin help

Recommended method is to push this via a widget

–This is quite involved

–Sadly we don't have time to show you in detail

–But we have documented it - check the references slide at the end

Or.... include the extension Library features and plugins into a composite Application

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Installing UP-1

What Is UP-1?

– IBM Lotus Notes and Domino Upgrade Pack 1

– Packaged version of the Extension Library including updated Teamroom and Discussion templates

– Domino Access Services (JSON based REST services for Domino data)

– FULLY SUPPORTED by IBM

Separate executable installer (ie, nothing like the previous install) for server and client

– Installs version 8.5.3.20111208-0717

– Does NOT update the client or server version number

– Check for an UP1 directory on the server. On the client, start digging!

UP-1 can be deployed via update site

– Run client install and extract to a directory. Updatesite.zip will be created

– Use this to create an internal update site

– **This is not recommended for the client (server is OK)**

– Future upgrade packs will work REGARDLESS of current version

– Hence smart upgrade should work from now on

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Versions

XPages need to be compiled for the right version of Notes and Domino

- Consistency across the environment is important
- It is possible to save applications in Domino Designer 8.5.3 to run on earlier versions

Dojo for each version

- 1.6.1 with 8.5.3
- 1.4.3 with 8.5.2
- 1.3.2 with 8.5.1
- 1.1 with 8.5.0

OneUI for each version

- Similar to Dojo the versions of OneUI continue to change as XPages is upgraded

Update Pack 1 (2,3 etc)

- Applications using these features will need to be co-ordinated between admins and developers.

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Quick Server Performance tips

Give the server lots and lots and lots of RAM. And then some more.

Use a 64-bit OS

Devote fast disk or SSD to your servers' *program files* volume

–This is where the XPages code is called from

Isolate heavily used XPages apps

–Especially from other memory intensive apps such as Traveler

Consider dedicated Domino instances for large applications

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Performance

Use runtime optimized JavaScript and CSS resources

– Can dramatically improve perceived performance

– Especially on high latency networks (e.g. mobile)

Server Page Persistence

– Controlled from Application Properties in Domino Designer

– Use "Keep Pages In Memory" for smaller numbers of users

– Use "Keep Pages On Disk" for larger numbers of users

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Performance

Single copy XPage design

- An option in Application Properties in Domino Designer
- Allows lots of applications using the same template to share XPage code
- Saves loading more XPages into server memory
- Good example is the Discussion template
- Another example is from Declan Lynch who has 96,000 databases which share the same design thus saving approximately 6mb per database (that's 562gb!)

XPages ToolBox application

- Free application on OpenNTF
- Used to monitor code performance and memory usage

Pre-load XPage engine to improve startup times (Notes and Domino 8.5.3 onwards)

- XPagesPreload=1
- XPagesPreloadDB=servername!!path/mydb.nsf/myxpage.xsp,servername!!path/anotherdb.nsf

Memory

XPages run in a server side JVM

RAM is used to cache Extension Library, run code in a JVM and store state information

- on top of everything else
- Use memory wisely. Caching is good.

Check your CPU and Disk I/O

- In IBM's testing, an XPages discussion db uses 2x the CPU and 4x the Disk I/O to a standard discussion db, but less than half the network I/O

XPages will only run as fast as your server can

- Don't throttle it for disk, CPU or RAM
- Domino is disk intensive. Slow disk will slow everything

Use 64-bit Domino if possible, at least a 64-bit OS

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HTTPJVMMaxHeapSizeSet

XPages apps crashing, or acting weird until you restart the server?

Check log files for 'stack overflow' or "out of memory" - most likely there's a lack of memory

Check the servers' Notes.ini for HTTPJVMMaxHeapSize

- in 8.5.1 - Set to 256M by default
- in 8.5.2 - will be reset to 64M automatically
- Set HTTPJVMMaxHeapSizeSet = 1 to stop this being reset
- Ideally, set to 1/4 of total RAM

Note: This is only for 32-bit servers. For 64-bit, this defaults to 1 Gigabyte

- did we mention lots of RAM helps?

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Scoped Variables

A new concept with XPages they allow the developer to store data temporarily in memory

Makes applications much faster as you don't need to access data from disk as often

But...

– Scoped Variables need memory

– We will talk about the notes.ini options

– Scoped Variables are not shared across clusters

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XPages Performance in the Client

Be careful if deploying client applications using XPages

Remember, XPages run IN the client on a local server

–They are effectively Eclipse plug-ins, like the Sametime client

As they run locally, memory and CPU overhead will increase

–This may tax already overloaded clients

The Initial XPage download to the client may be large

–Make sure to enable Network Compression

–Think about pre-loading XPages objects here too, but be careful of memory!

Sessions

Classic Domino web apps have SSO timeouts set in the server or website document

XPages uses these <u>and</u> session and application timeouts configured in the Application Properties in Domino Designer

It's easy to get them confused
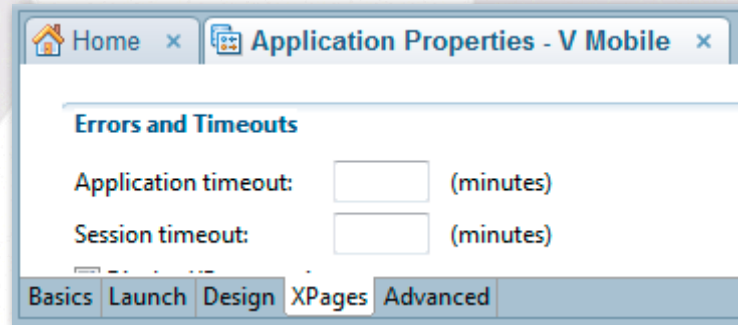
Sessions

By Default the session and application timeouts will be 30 minutes but these can be increased

–For applications where users have long periods of inactivity

It is possible they may also want to be decreased for very large, heavily used applications

Work with your developer before changing these

If you are going to change these then generally you'll want to set the session and application timeouts to be longer than SSO timeouts

–But make sure your server has enough memory to support this

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Server Configuration

Some development tools will require files added or changed in the server install

These are usually to do with Java plugins

JDBC allows integration with relational databases

- Easiest with the Extension Library
- copy the relevant file into the server:
- ...\domino\xsp\shared\lib\[jdbcdriver].jar

You may need to open ports to connect to the database server

- For example MySQL operates on 3306 by default
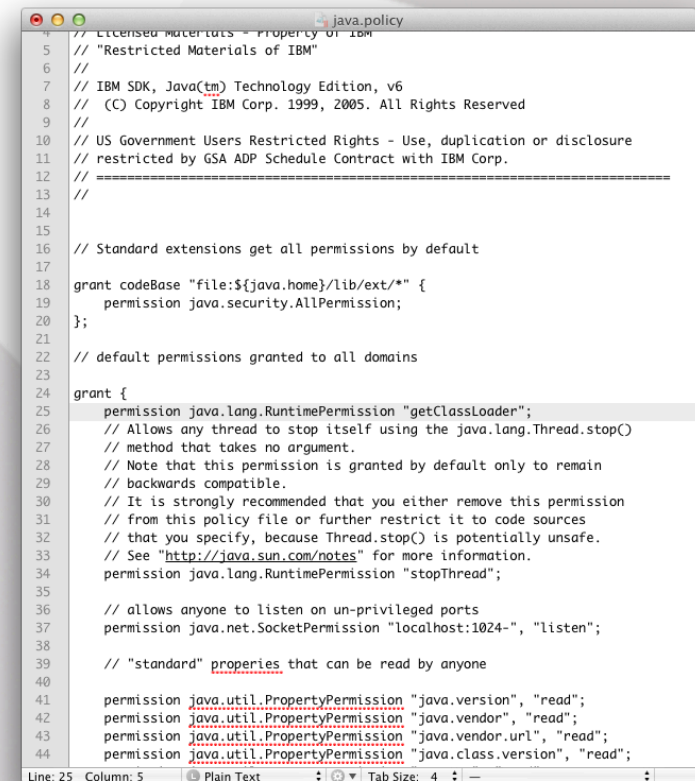
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Server Configuration

PD4ML is an example of a Java library which needs extra permissions to run

- Open ...\domino\jvm\lib\security\java.policy
- Extra line needs to be added:
  ```
  permission
  java.lang.RuntimePermission
  "getClassLoader"
  ```


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Server Configuration

It is possible to change the version of Dojo which an application uses

If the developer needs this then the different version of Dojo would need to be downloaded and copied onto the server

Dojo versions live in: ..\domino\data\domino\js\..

Clustering and high availability

XPages apps store state information in memory rather than on disk

- So you must be careful when using clusters
- Developers - take heed!

Deploy a load balancer carefully

- Use 'stickyness' to ensure users stay on the same server
- Distribute users evenly between servers
- Try never to fail over a user unless you *have* to
- Developers - what if a server in a cluster fails? Can your code rebuild the users' state?

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Scaling

View Designs and View Indexing

– If anything more important than with classic Notes and Domino applications

– Column sorting and re-sorting makes indexes larger

– The more documents in a view the slower it will be

– Use of readers fields on documents will effect performance

Full Text Indexes

– Can be used by XPages in much the same way as classic Notes and Domino

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Logging

Some sort of logging needs to be set up

- OpenLog is a good free option
- http://www.openntf.org/projects/pmt.nsf/ProjectLookup/OpenLog
- Look at the slide deck for "Write Better Java Code: Debugging, Logging, and Unit Tests (SHOW114)" for more information

Error Page

- Configured in Application Properties in Domino Designer
- Allows the developer to control what is displayed when there is an error
- Errors will still be written to the server console
- Error 500 means there's something wrong with the application!
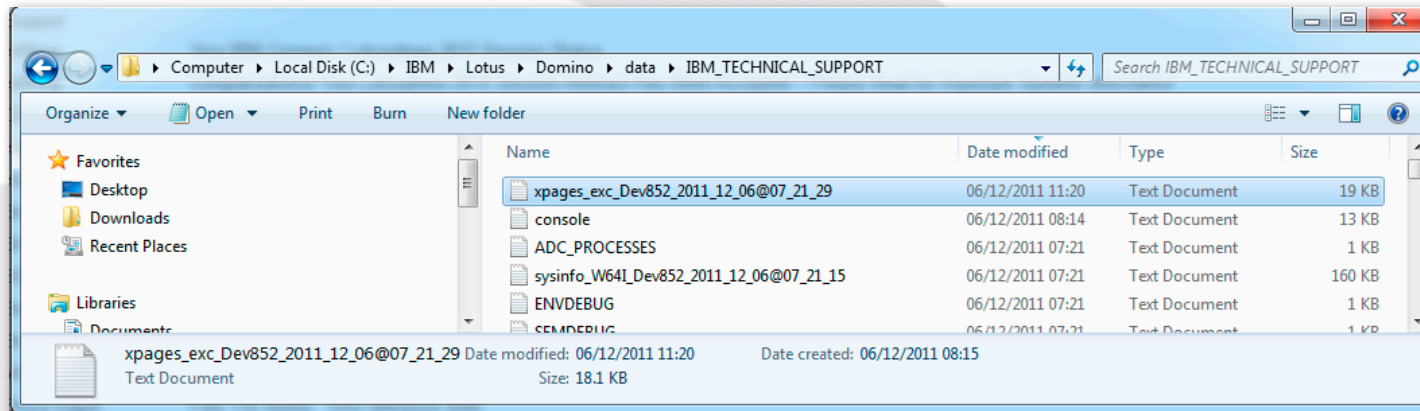
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Logging

From the server side unhandled errors are written to the server console

Further detail is available in the ..\domino\data \IBM_TECHNICAL_SUPPORT folder

Files will be prefixed "xpages_"

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Hidden Code

In Domino Designer it is possible to create Java code which does not show up by default
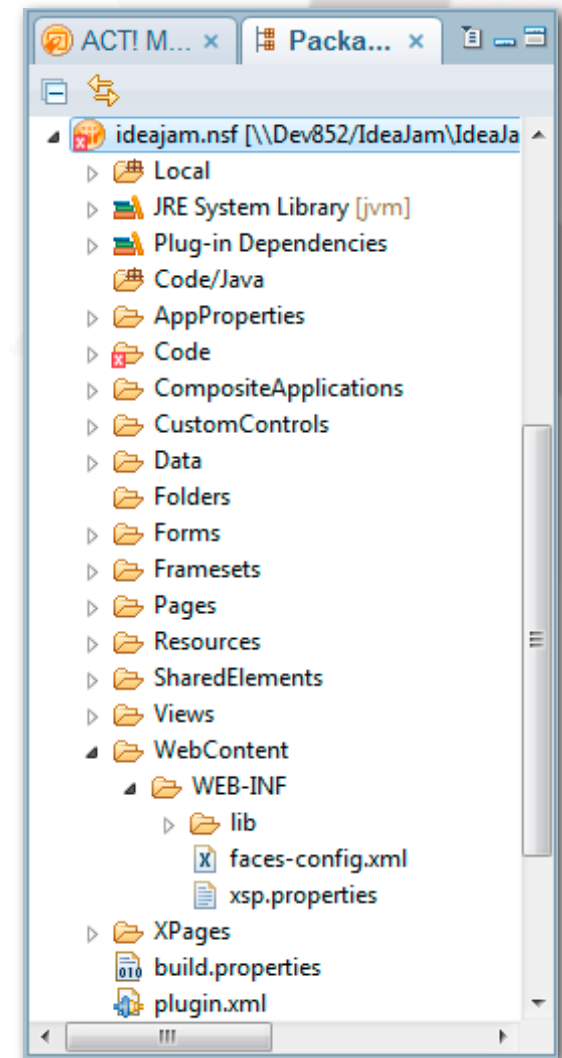
Java created this way is not a normal design element

– It is not signed in the same way

Accessed via the menu system:

– Window -> Show Eclipse Views -> Other -> Package Explorer

There's all sorts of extra configuration which can be done here as well

If code changes here you may need to restart HTTP to pick up the change

Security

In XPages we have three types of session

- –session - runs as current user
- –sessionAsSigner - runs with the rights of the XPage signer
- –sessionAsSignerWithFullAdminRights - runs with full admin rights

For audit purposes make sure you understand what is being used

Full Admin rights should never be given unless there's an *extremely* good reason!

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Security

Access Control, Readers and Authors work exactly as we're used to

Each XPage and Custom Control can also have its own ACL

- –The user may get prompted to login
- –Or sections of the page may become invisible or read only
- –Depends on settings in the application design

Security and Signing

The usual best practises apply - use Signing IDs

XPages apps respect Server security settings in the Server Doc

There is a gotcha - "*Sign or run unrestricted methods and operations*'

Admins will almost certainly need to include your XPages signing ID in this field

- Means you allow people in this group to run unrestricted code OR call external code
- The Extension Library and much of XPages is 'external' code
- Therefore you will need this for almost all XPages applications

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Signing

XPages which are not signed with the correct ID will give an Error 403 - Insufficient Rights to Perform Operation

Admins - sign apps as usual!

–Domino will use 'lowest common denominator' of code signatures

Extension Library

–code runs within domino server jvm so *not* affected by server doc security

–C:\Lotus\Domino\jvm\lib\security\java.policy - for any java code

–You have limited control here

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XPages in the client

XPages in the client

– Check the NoExternalApps notes.ini variable (this would stop most XPages working!)

Will support and honour client ECLs - but...

– XPages run using Java APIs

– Notes will map Java Security Manager requests to Notes ECL

– If you are using external java code (Extension Library...) that will need to be trusted too

Code should be signed too

– But features and plugins can't be signed by Notes IDs

– You will need a public code certificate to sign this code

– Check out our references for a link to do this.

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Other stuff

XPages can be used to target lower level databases

- Perhaps old databases that are on R7?
- Deply an XPages application server, use your current server as a data store only

XPage server must be 8.5 and system TEMPLATES must be 8.5 too

- You may need to create a separate domain for the application servers
- Remember to setup cross certification and ACLs appropriately
- Your data can remain on an R7 server but you can deploy a shiny new interface!

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References

XPages server performance testing -

– http://www.ibm.com/developerworks/lotus/library/domino85-xpages-perf/

Deploying Client plugins (ie Extension Library) via widgets - IBM documentation

– http://publib.boulder.ibm.com/infocenter/domhelp/v8r0/index.jsp?topic=/
com.ibm.help.domino.admin85.doc/
H_SPECIFYING_THE_SIGNED_PLUGINS_SERVER_USING_POLICY_5232_OVER.
html

Deploying Client plugins (ie Extension LIbrary) via widgets - Our documentation

– http://www.elsmore.net/ls12

Upgrade Pack 1

– https://www.ibm.com/developerworks/mydeveloperworks/blogs/social-media-marketing/
entry/mobile_web_fortified_with_xpages_and_dojo12?lang=en

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Questions?

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