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# *OS/390 Web Server Deployment Issues*

M McNamee

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# *Agenda*

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Why install a Web Server on OS/390

Installation issues

Exploiting existing applications

Migrating existing web sites

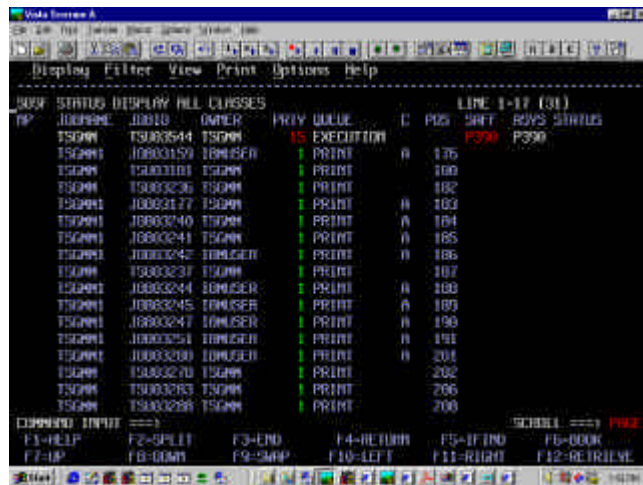
Developing applications

Alternatives to using OS/390 Web Server

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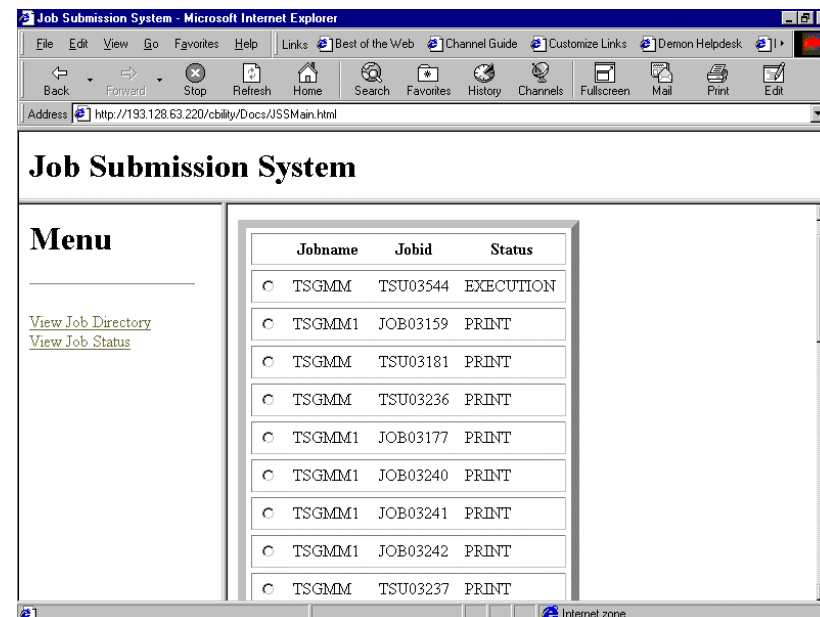
# Why install a Web Server on OS/390 ?

Provide a new user interface - rejuvenate existing applications:



The screenshot shows a mainframe terminal window with a job status report. The report is a table with columns for JOBID, STATUS, DISPLAY, ALL, CLASSES, and LINE. The data is as follows:

JOBID	STATUS	DISPLAY	ALL	CLASSES	LINE
J080000	J08010	OWNER			
TS000	TSU00544	TS000		EXECUTION	176
TS000	J0800159	J080000		PRINT	180
TS000	TSU003181	TS000		PRINT	182
TS000	TSU003236	TS000		PRINT	184
TS000	J08003177	TS000		PRINT	185
TS000	J08003240	TS000		PRINT	186
TS000	J08003241	TS000		PRINT	187
TS000	J08003242	J080000		PRINT	188
TS000	TSU003237	TS000		PRINT	189
TS000	J08003244	J080000		PRINT	190
TS000	J08003245	J080000		PRINT	191
TS000	J08003247	J080000		PRINT	201
TS000	J08003251	J080000		PRINT	202
TS000	J08003280	J080000		PRINT	206
TS000	TSU003270	TS000		PRINT	208
TS000	TSU003283	TS000		PRINT	209
TS000	TSU003286	TS000		PRINT	210



The screenshot shows a web browser window displaying a "Job Submission System" interface. The interface includes a menu and a table of job details. The table has columns for Jobname, Jobid, and Status. The data is as follows:

Jobname	Jobid	Status
TSGMM	TSU03544	EXECUTION
TSGMM1	JOB03159	PRINT
TSGMM	TSU03181	PRINT
TSGMM	TSU03236	PRINT
TSGMM1	JOB03177	PRINT
TSGMM1	JOB03240	PRINT
TSGMM1	JOB03241	PRINT
TSGMM1	JOB03242	PRINT
TSGMM	TSU03237	PRINT

Users don't like the screen - so replace the screen not the business logic

# *Why install a Web Server on OS/390 ?*

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Consolidate applications :

Tired of those many servers? Consolidate !



Fewer systems are easier to manage

OS/390 Reliability Availability Serviceability (RAS)

Throughput - Web Server on OS/390 attains record 21,591 hits per second

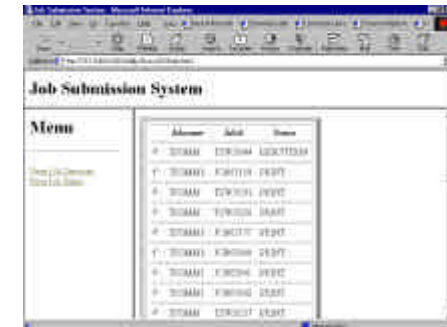
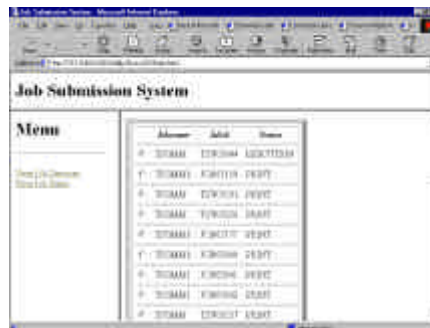
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# Why install a Web Server on OS/390 ?

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Exploit existing applications & data

Introduce applications to new audiences  
without specialist software such as 3270  
emulator



Simplify desktop management by going back to a  
terminal ( thin-client ) philosophy.

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# *Installation Issues*

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Documentation

UNIX Services Configuration

Domino Installation & Configuration

Security Configuration

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# *Documentation*

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UNIX services documentation not easy for the beginner  
Assumes knowledge of UNIX and does not discuss the  
interaction of UNIX with OS/390 in easy to absorb  
manner

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# *UNIX Services Configuration*

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Customize and review BPXPRMxx Values

MAXPROCSYS(200)

MAXPROCUSER(25)

MAXUIDS(200)

MAXFILEPROC(64)

MAXPTY(256)

FORKCOPY(COW)

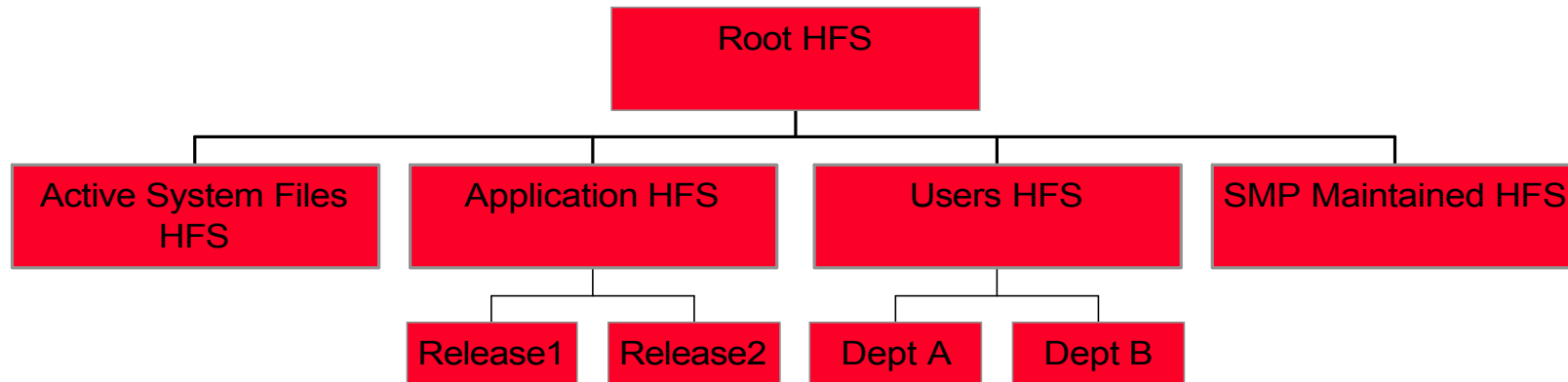
MAXCPU(100)

MAXTHREADTASKS(500)

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# UNIX Services Configuration

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- Separate user and system files in separate HFS
  - Use mount points to be able to easily move
  - Placing logs on a separate HFS limits log growth
  - HFS cannot span volumes ( < DF/SMS 1.5 )
  - Logical grouping in HFS eases backup/restore
-

# *UNIX Services Configuration*

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## RACF

Plan UIDs and GIDS to be used

Often advantageous to use the same as the UNIX environment where possible esp. with NFS

Activate RACF program control

Refer to APAR for II10548 for more info. This saves time later !!!!

Get a copy of RACF diagnosis manual to hand to diagnose those Dirty environment issues

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# *Domino Configuration*

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## IMWEBSRV JCL:

Run options such as SMF

Server type - Standalone - Multiple using WLM

Listen port - make sure it's not blocked by routers or firewalls !!!!

Name of config file ( httpd.conf )

Consider use of Verbose (-v) and Very Verbose (-vv) mode to debug initial configuration .....

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# *Domino Configuration*

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/usr/etc/httpd.conf

Mapping Directives

Can be used to hide directory structure

Use of Verbose is useful to troubleshooting

Customize httpd.envvars

Java CLASSPATH needs much more than default

Path needs modification also

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# *Domino Configuration*

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`/usr/etc/mvsds.conf`

Access OS/390 datasets via browser or CGI program

Data is Pre-Loaded changes not reflected - use with static data only

Consider using OGET and OPUT or BPXWDYN service for dynamic data in CGI scripts

See sample Web SDSF front end for example.....

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# *ServletExpress Configuration*

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Look out for errors in the manual - servlet.conf no longer exists

For an up to date installation refer to

<http://www.s390.ibm.com/nc/servlett.com>

<http://www.software.ibm.com/webserver/dgw/os390ud.htm>

Servlet support activated by adding these directives to httpd.conf :

```
ServerInit /usr/lib/libadpater.so:AdapterInit  
/u/cbility/web/config/jvm.properties
```

```
ServerTerm /usr/lib/libadpater.so:AdapterExit
```

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# *ServletExpress Configuration*

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Java JVM properties file ( jvm.properties ) has many references to C:\.... Needs to be corrected

Missing links and attributes :

External links libadpter.so libicsnativ.so

Jav\_dll.so httpd\_V5R0M0 may be incorrect or missing - errors listed as 205 DLL Not found

Solution :

In -e EJSADPTR libadpter.so

In -e EJSICSNT libicsnativ.so

In -e HTTPD httpd\_V5R0M0

In -e IMWJAVDL Jav\_dll.so

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# *ServletExpress Configuration*

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Missing links and attributes :

Lack of Program control attributes may dirty  
Domino address space

IMW0240E Access denied - unauthorized  
program loaded

```
cd <JAVA_HOME>/lib/mvs/native_threads  
extattr +p *.* ( add program control )
```

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# *ServletExpress Configuration*

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Is it working yet ?

Message “ServletExpress native plugin initialization wen OK :-)” on joblog

Attempt to connect to port 9090 - class load error will probably occur

unjar admin application from jar file :

```
cd/usr/lpp/ServletExpress/web/admin/classess
```

```
jar xvf seadmin.jar
```

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# ServletExpress Configuration

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Is it working yet ( continued )?

Check if the Java VM has initialized OK

native.log and ncf.log

Diagnose exceptions using Java Doc e.g.

Java in a Nutshell or <http://java.sun.com>

Common error is

java.lang.ClassNotFoundException - path is incorrect. Use find to find file and/or use jar ( jar tvf *filename* ) to look into jar files. Jar files must be explicitly mentioned in CLASSPATH in jvm.properties file

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# *Security Configuration*

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Consider use of Surrogate UID for CGI programs

Limit the scope for abuse using the browsers  
command line

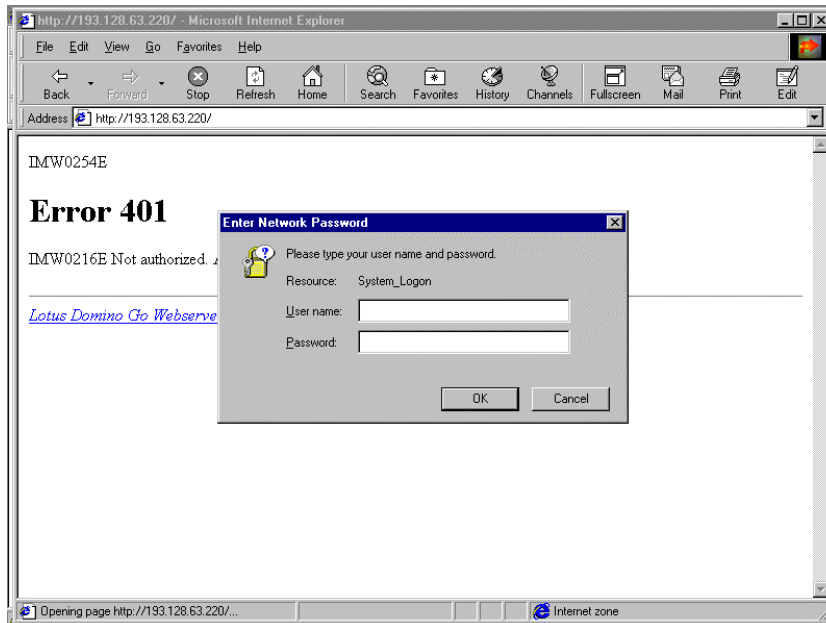
Consider use of directory access control lists to further  
limit access

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# Security Configuration

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## Why Enable SSL ???



HTTP authentication uses a simple algorithm to mask passwords - care must be taken if using SAF for authentication

HTTP keeps sending the password with each request

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# Security Configuration

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Httpd.conf directives :

SSLPORT 443 ( Default )

SSLCipherSpec

SSLMode on

Server requires a certificate and details of trusted  
Certification Authorities (CA)

IKEYMAN utility create/migrate Key Ring file

Old Keyring files (\*.kyr) must be migrated to KEYMAN Key  
Database file (\*.kdb)

Be your own CA - Intranet/testing

Receive Server Certificate from CA such as VeriSign

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# *Exploiting Existing Applications*

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Access Data in CICS using CGI

Use the CICS External Call Interface ( EXCI )

Requires that presentation and Business logic is separate cannot directly manage 3270 data streams

Example available :

<http://www1.s390.ibm.com/nc/sntc/CICS.html>

3270 Datastreams can be hidden behind Front End Programming Interface ( FEPI ) or 3270 Bridge  
Redbook SG24-5243 for samples

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# *Accessing DB/2 and VSAM Data*

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The UNIX Tools and toys page supplies a sample utilities :

execsql - sample DB/2 query :

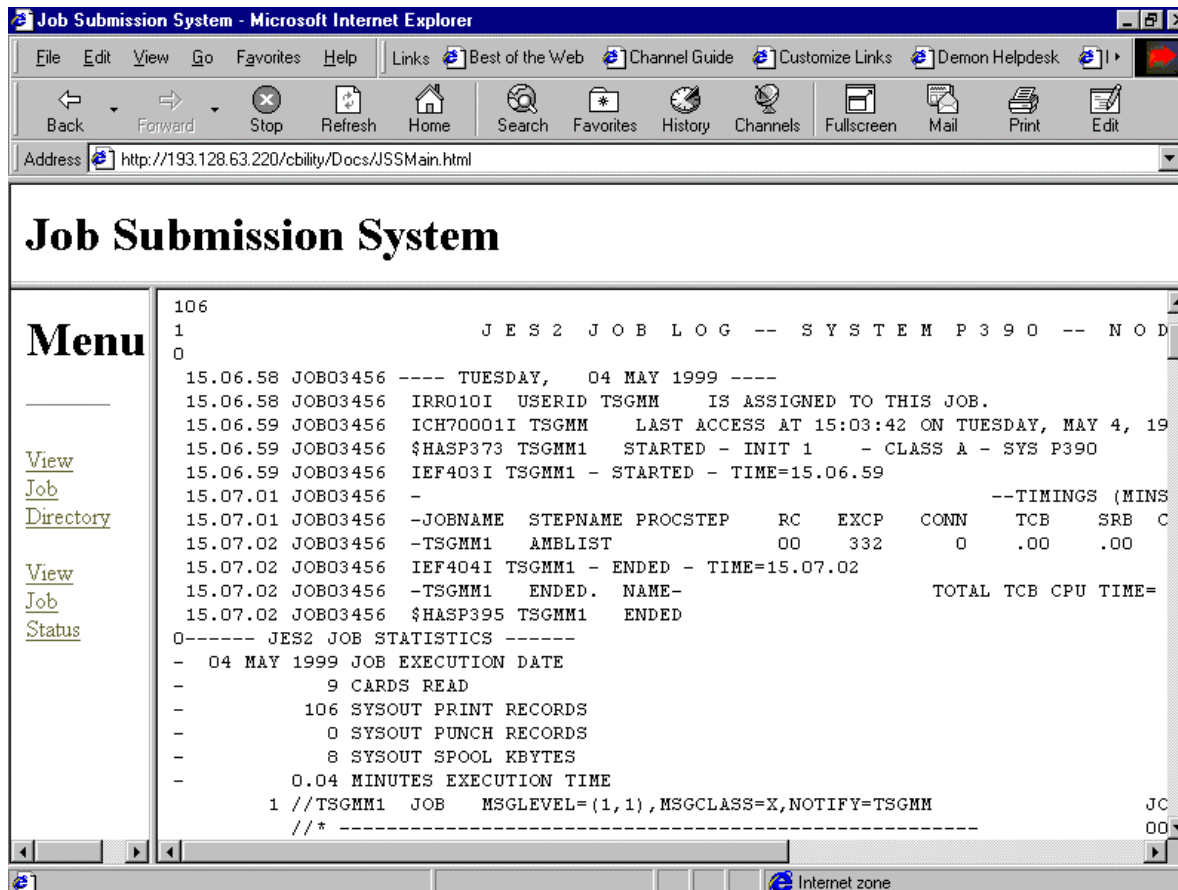
<http://www1.s390.ibm.com/oe/bpxa1ty2.html>

vsamread - sample VSAM KSDS read program

<http://www1.s390.ibm.com/nc/sntc/VSAM.html>

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# Accessing TSO applications

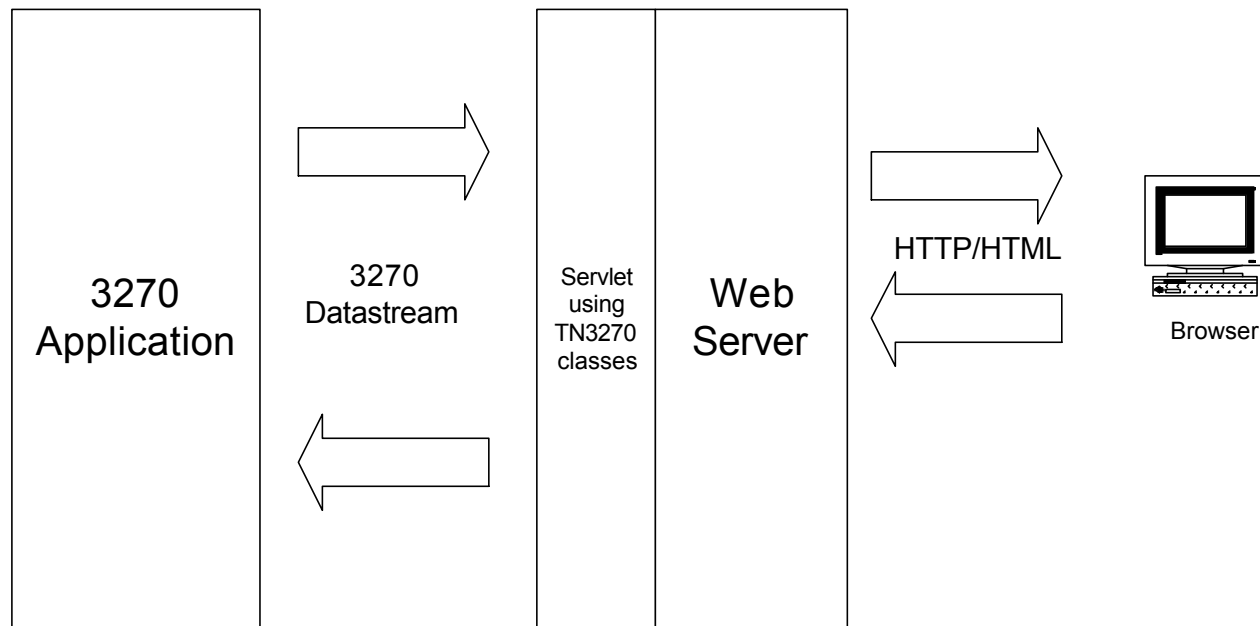


REXX can be easily used under Domino. The sample application provides a system to submit jobs and view output using. This application is written completely in REXX

# 3270 Applications

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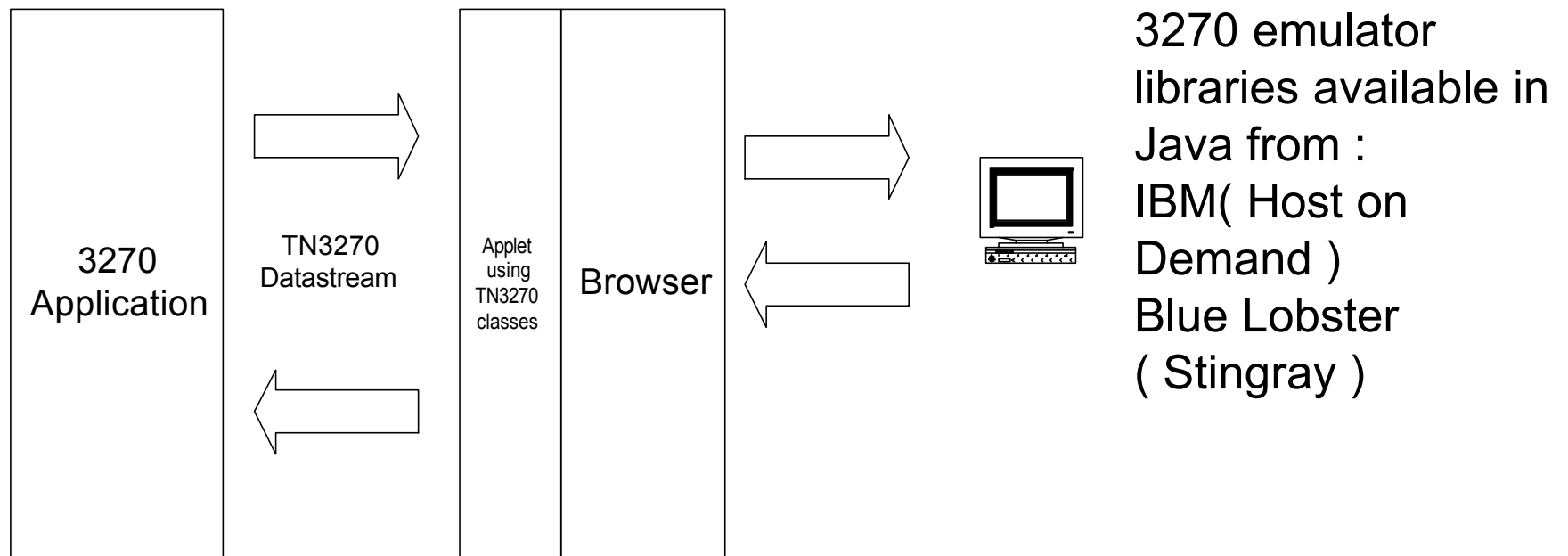
Java Sevlets running on OS/390 can be used to Front-End 3270 applications



# 3270 Applications

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3270 screen can be hidden using Java Applet on the browser

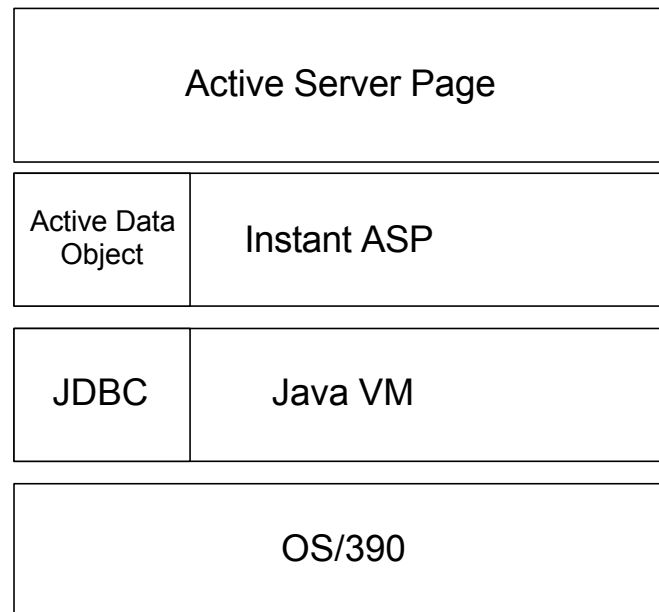


# Migrating Web Sites

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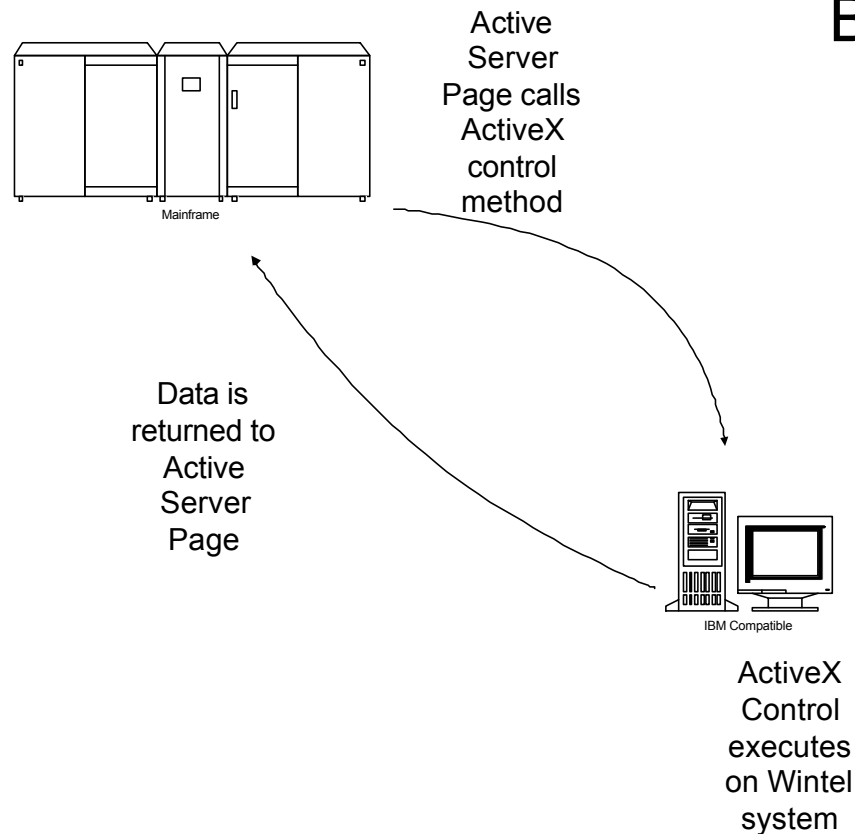
## Beware of Active Server Pages

Instant ASP from Halcyon Software provides ASP using a Java Servlet. This allows OS/390 to use ASP



# Migrating Web Sites

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Beware of Server Side ActiveX controls. These controls are only executable on Wintel platform

R-Jax from Halcyon allows Java applets on any platform to access ActiveX controls by encapsulating them with a Java Bean on a 'Donor' system

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*The end !!!!*

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Any Questions ????????

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