From zero to zHero: Java Batch development for IBM System z



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Disclaimer

This document was created as an instruction guide for the Java Batch workshop in Germany and is no official IBM reference guide.

1 Introduction and general hints

This lab guide shell is intended as an introduction for people to become familiar with Java on z/OS.

You should not need any Java skill to run through these labs, but basic knowledge of z/OS and Mainframe technologies is required to understand them.

Here are some general hints that you should read before you begin with this lab:

- Java is case sensitive. So always be careful when you type Java source code!
- This lab guide is also available as PDF-document on the target machine under /u/fhbmstr/jbatch/docs/howto/lab_guide.pdf.
- When you copy content from the lab guide and paste it into development tools, always be aware that some line breaks in this document might cause failures. In that case, remove the line break.
- Here are some general hints for ISPF:
 - When you are requested to press <enter>, please press the <right CTRL> key!
 - If you see stars (three stars!) *** please press <enter>
 - You can only enter data in special screen areas. Use the <TAB> key to go to the next typo field
 - If you try to enter data in a non-typo area, your keyboard will be locked (see red sign, last line, left side $\leftarrow \odot \rightarrow$)

2 Getting started

This lab explains how to connect to the workshop host system and lists general information on the system structure.

2.1 Setup PCOMM and start TSO

In this lab, we will establish a new TSO connection via PCOMM to the workshop host system.

Note: if you are using Host on Demand, please go directly to chapter 2.2 on page 8.

- 1) To establish a 3270 via TSO, Select **Programs** from the Windows Start menu → **IBM Personal Communications** → **Start or Configure Session**
- 2) Select New Session...

Γ.	Select Connection to	o Host		
]	Type of Host:	zSeries 💌		
Ī	Interface:	LAN		
1	Attachment:	Telnet3270		•
		Link Parameters	Session Paran	neters
	Connection Overvie	w	044 b t	Time of Unit
	6	≥('		
	LA	N .	Telnet3270	zSeries
	- This connectio TN3270E interfa load balancing a - This selection i	n provides access to an IBM zSeri ice. Support for Service Location F ind backup host is also provided. s used in networks that typically ru ity can also be used to connect to	es host over a TCP/IP network, u Protocol, SSL V3 and TLS1.0 sec n TCP/IP protocols. a host network through a firewal	using TN3270 or cure layer encryption,

4)	Enter 129.35.161.131 as Primary Host Name and select OK .	
		1

	Host Name or	Illor	Port
	IP Address	Pool Name	Number
Primary	129.35.161.131		23
Backup <u>1</u>			23
Backup <u>2</u>			23
Connection Options			
Connection Timeout	6 ÷ Seconds		
Try connecting t	o last configured host infinitely		
Try connecting t	o last configured host infinitely	20)	
Try connecting t Printer Association (Associated Printer S	o last configured host infinitely (only valid for TN3270E Display session	ns)	
Try connecting t Printer Association (Associated Printer S	o last configured host infinitely (only valid for TN3270E Display session Session	ns)	
Try connecting t Printer Association (Associated Printer S	to last configured host infinitely (only valid for TN3270E Display session Session	ns)	Browse
Try connecting t Printer Association (Associated Printer S Start Associated	to last configured host infinitely (only valid for TN3270E Display session Session	ns)	Browse
Try connecting t Printer Association (Associated Printer S Start Associated Associated	to last configured host infinitely (only valid for TN3270E Display session Printer Minimized	ns)	Browse
Try connecting t Printer Association (Associated Printer S Start Associated Automatically cle	o last configured host infinitely (only valid for TN3270E Display session Session I Printer Minimized ase the associated printer session with	ns)	Browse
Try connecting t Printer Association (Associated Printer S Start Associated Automatically cle Enable Security.	to last configured host infinitely (only valid for TN3270E Display session Session I Printer Minimized ase the associated printer session with	ns)	Browse
Try connecting t Printer Association (Associated Printer S Start Associated Automatically cle Enable Security	to last configured host infinitely (only valid for TN3270E Display session Session I Printer Minimized ase the associated printer session with	ns)	Browse

5) Select Session Parameters...

Cu	stomize Communi	cation				- X
	- Select Connection to I	Host				
	Select Connection to		7			
	Type of Host:	zSeries 💌]			
	Interface:	LAN]			
	<u>A</u> ttachment:	Telnet3270				J [
		Link Parameters		Session Pa	rameters]
	Connection Overview					
	Interfa	ce		Attachment	Туре	of Host
	 &	<u> </u>	TCP/	₽	· 🔟	-000
	LAN	I .		Telnet3270		zSeries
	This connection TN3270E interfac load balancing an - This selection is - This connectivity	provides access to an IBN e. Support for Service Loc d backup host is also prov used in networks that typic can also be used to conr	AzSeries ho ation Proto- ided. cally run TC nect to a ho	est over a TCP/IP networ col, SSL V3 and TLS1.0 P/IP protocols. st network through a fire	k, using TN3270 or secure layer encryptic wall which supports N	n, ≣ VT ♥
	ОК		Can	cel	Hel	>

6) Select 24x80 as screen size and 1047 as Host Code-Page. Click OK.



- 7) Select OK.
- 8) You should now be able to login to TSO. Enter **TSO** and press Enter when the following screen appears:

32 Session A - [24 x 80]	
Eile Edit View Communication Actions Window Help	
ZZZZZZZZZEEEEEEEEEEUUUUSSSSSS SS ZZZZZZZZZZZZEEEEEEEEEEUUUUSS SS SS ZZZZEEUUUUSSS SSS ZZZZEEEEEEUUUUSSSS SSS ZZZZEEEEEEUUUUSSSS SSS SSS ZZZZZZZZZZZEEEEEEUUUUSSSS SSS SSSS ZZZZZZZZZZZEEUUUUSSSS SSS SSSSS SSSSSVOUR IP ADDRESS :80.187.104.1	
YOUR TELNET PORT : 02215	
APPLICATIONS AVAILABLE	
TSO	
SELECT APPLICATION ==>	24/029
∭් Local socket trying to connect to remote server/host 129.35.161.131 using port 23 infinitely	247 029

9) Login with your credentials.

2.2 Setup Host On-Demand

1) Go to http://zeus.moppssc.com/hod/HOD_en.html and login with your credentials.

IBM Host On-Demand User ID : univ Password : ******	
Change Password	

2) Right-click on Zeus z/VM gateway (SSL secured) and select Properties.

ost On-Demand	Client		
	l Cor Double-click	nfigured Sessions an icon to start a session.	Active Sessions
3270 U Zeus z/OS VT System Services (ssh)	3270 Zeus z/ gateway secure	VT 3270 Start Session Zeus z/VM Copy Gateway Delete THOUT SSL) Set Up Bookmark Export Session Properties Properties	

 \square



Add Sessions Log Off Help

👙 Zeus z/VM gateway (SSL secured) - A	
File Edit View Communication Actions Help	
= = ≠ ≠ ≈ • • • • = ×	달 💿
z/VM 5.1 ONLINE	
This is Zeus, the mainframe of the IBM System z University Program for Eu	игоре
System z Europe University System	z/OS z/YM Linux for System z z/VSE
Access only permitted when authorized by explicit a	agreement with IBM
To access the Zeus z/OS system, type DIAL ZOS	
To access your own university's second-level z/VM sytype DIAL followed by its name, for example: DIAL FO	ustem, DOVM
System ===> DIAL ZOS_	RUNNING ZEUSZVM
lê <mark>l</mark> + a	23/023
	▲ j=▲ j129.35.161.130:992 j
Enter TSO.	*
👙 Zeus z/VM gateway (SSL secured) - A	
File Edit Yiew Communication Actions Help	
🗣 👧 🗣 🏟 🕾 💥 📖 📥 🚢	<u>모</u> ③
**************************************	*****
TSO – TSO/E CICS – CICS/TS	
IMS - IMS∕ESA	
IBMSM - IBM SessMgr	
==> tso	

End of lab 😳

2.3 Basic information

The following table shows the most important properties of the workshop host system.

	Value	Comment
Userid	UDE00##	
Password	UDEPW##	
IP	129.35.161.131	
Ports	129.35.161.131:23	Telnet 3270
	129.35.161.131:21	FTP
Java home directories	/usr/lpp/java/IBM/J1.3	Java 1.3
	/u/fhbmstr/jbatch/local/java/J5.0	Java 5.0
	/u/fhbmstr/jbatch/local/java/J6.0	Java 6.0
User's home directory	/u/UDE00##	
Workshop files	/u/fhbmstr/jbatch	
User's HLQ	UDE00##	
Master home directory	/u/fhbmstr	
Master HLQ	UDEMSTR	

3 HelloWorld (terminal based)

In this lab, you will create your first Java HelloWorld application on z/OS with a terminal session.

3.1 Verify Java installation

Before you start with HelloWorld, you have to verify that Java is installed correctly on z/OS.

Login to TSO as described at the end of chapter 2.1.
 Open an OMVS shell:
 TSO OMVS
 In the Unix shell type:
 java -fullversion
 If Java reports its version the JVM seems to be OK

End of lab ③

3.2 Your first Java HelloWorld

This lab will show you how to develop a Java Hello World on the terminal.

- 1) Logon to TSO if you have not done so far.
- 2) Open an OMVS shell if you have not done so far:

```
TSO OMVS
```

3) Change to your home directory /u/UDE00## and create a new directory myjava. After each step, select enter:

cd /u/UDE00## mkdir myjava

4) Create a new Java file in this directory and edit it. After each step, select enter:

cd myjava oedit HelloWorld.java

5) Insert the following text into the new file:

```
class HelloWorld
{
    public static void main(String[] args)
    {
        System.out.println("Hello World!");
    }
}
```

6) Save and exit with:

FЗ

7) Compile the Java file by entering the following command:

javac HelloWorld.java

8) This will create a new file HelloWorld.class. Enter the following command to run the HelloWorld example in the Java Virtual Machine (JVM):

 \square

java HelloWorld

- 9) You should see a *HelloWorld* on the command line.
- 10) Exit OMVS by entering

Exit

End of lab ©

4 BPXBATCH Labs

4.1 HelloWorld mit BPXBATCH



End of lab 😳

4.2 Java BPXBATCH with parameters

This lab will show how to use BPXBATCH with Java and parameters. The parameters you specify in the JCL for the Java program will be printed out by the Java program to SDSF.

1) Call OMVS: Enter

TSO OMVS

2) Change to your myjava sub directory of your home directory

cd myjava

3) In this directory, create (or copy) a new Java file:

cp /u/fhbmstr/jbatch/source/Parameter.java /u/UDE00##/myjava

Or

oedit Parameter.java

accordingly:

```
class Parameter
{
    public static void main(String[] args)
    {
        for (int i=0; i<args.length; i++)
        {
            System.out.println(args[i]);
        }
    }
}</pre>
```

4) Save and exit with

F3

5) Compile the Java file by entering the following command:

javac Parameter.java

This will create a new file Parameter.class.

6) Exit OMVS by entering

```
Exit
```

7) Copy from UDEMSTR.JBATCH.SAMPLES.JCL(BPXPARM) the following job in your UDE00##.SAMPLES.JCL(BPXPARM) using ISPF 3.3:

```
//BPXBATCH JOB ,REGION=0M
     //* Run Java under a UNIX System Service shell
//STEP2 EXEC PGM=BPXBATCH,
// PARM='SH java Parameter Test1 Test2'
//STDIN DD DUMMY
//STDOUT DD PATH='/u/UDE00##/myjava/bpxbatch.out',
// PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
// PATHMODE=SIRWXU
//STDERR DD PATH='/u/UDE00##/myjava/bpxbatch.err',
// PATHOPTS=(OWRONLY,OCREAT,OTRUNC),
// PATHMODE=SIRWXU
//STDENV DD *
CLASSPATH=/u/UDE00##/myjava
//* Copy HFS output files to SYSOUT, since BPXBATCH can only write
```



- 8) Change the Classpath to the directory where you have created the .class file and point STDOUT, STDERR, HSFOUT and HSFERR to /u/UDE00##/myjava
- 9) Submit the job

sub

10) Check results with SDSF. You should see something like this:

Test1
Test2

End of lab ©

4.3 JZOS Labs

4.4 Installation of JZOS for JVM 6.0

1) Allocate a new dataset UDE00##.JZOS.LOADLIB under 3.2 with the specified narameters:

Qaratifictors. Qaratifictors. Session A - [24 x 80]	a <u> </u>
File Edit View Communication Actions Window Help	
<u>M</u> enu <u>R</u> efList <u>U</u> tilities <u>H</u> elp	
Data S	et Utility
A Allocate new data set	C Catalog data set
R Rename entire data set	U Uncatalog data set
D Delete entire data set	S Short data set information
blank Data set information	V VSAM Utilities
Project Ente	r "/" to select option
Group / C	onfirm Data Set Delete
Туре	
Other Partitioned, S <mark>equential or YCAM</mark>	Data Cat:
Data Set Name <u>UDE0030.J20S.</u> Volumo Sopial	LUADLIB
	not cataloged, required for option c)
Data Set Password (If	password protected)
Option == :> <u>A</u>	
FI=Help F2=Split F3=Exit	F7=Backward F8=Forward F9=Swap
мА щ а	22/015
MA a 33 Connected to remote server/host 129-35.161.131 using lu/pool TCP01085 and port 23	22/015
MA a ³ ³ Connected to remote server/host 129.35.161.131 using lu/pool TCP01085 and port 23	22/015
MA a 3 ²¹ Connected to remote server/host 129.35.161.131 using lu/pool TCP01085 and port 23	22/015
MB a 3 ³² Connected to remote server/host 129.35.161.131 using lu/pool TCP01085 and port 23 Management class	(Blank for default management class)
M£ a ³³ Connected to remote server/host 129:35.161.131 using Nu/pool TCP01085 and port 23 Management class Storage class	22/015 (Blank for default management class) (Blank for default storage class)
MA a 3 ³ Connected to remote server/host 129.35.161.131 using Lu/pool TCP01085 and port 23 Management class Storage class Volume serial Doubles the pool	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Someric unit on douice address) **
MA a 3 ³ Connected to remote server/host 129:35:161:131 using Lu/pool TCP01085 and port 23 Management class Storage class Volume serial Device type Data class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class)
MA a 3 ³ Connected to remote server/host 129.35.161.131 using Lu/pool TCP01085 and port 23 Management class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS TPKS CVIS KB MB BVTES
MA a 3 ³ Connected to remote server/host 129.35.161.131 using ku/pool TCP01085 and port 23 Management class . Storage class . Volume serial . Device type . Data class . Space units .	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS)
MA a 3 ³ Connected to remote server/host 129.35.161.131 using Nu/pool TCP01085 and port 23 Management class Storage class Volume serial Device type Data class Space units	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M K or U)
MA a 3 ³ Connected to remote server/host 129.35.161.131 using ku/pool TCP01085 and port 23 Management class . Storage class . Volume serial . Device type . Data class . Space units . Average record unit Primaru guantitu .	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units)
MA a 3 ³ Connected to remote server/host 129.35.161.131 using ku/pool TCP01085 and port 23 Management class . Storage class . Volume serial . Device type . Data class . Space units . Average record unit . Primary quantity . 2 .	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units)
MA a 3 ³ Connected to remote server/host 129.35.161.131 using Nu/pool TCP01085 and port 23 Management class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) *
MA a 3 ³ Connected to remote server/host 129.35.161.131 using lu/pool TCP01085 and port 23 Management class Storage class Volume serial Device type Data class Space units CYLS Average record unit Primary quantity 2 Secondary quantity 2 Directory blocks 0 Record format U	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) *
MAR a 3 ³ Connected to remote server/host 129.35.161.131 using lu/pool TCP01085 and port 23 Management class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) *
ME a 3 ³ Connected to remote server/host 129.35.161.131 using hu/pool TCP01085 and port 23 Management class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) *
MA a J ² Connected to remote server/host 19:35:151:131 using luppod TCP01085 and port 23 Management class . Storage class . Volume serial . Device type . Data class . Space units . Average record unit . Primary quantity . Secondary quantity 2 Directory blocks . Record format . Block size . Jata set name type :	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) * (LIBRARY, HFS, PDS, or blank) *
MP a 3 ³ Connected to remote server/host 19:35:151:131 using lupped TCP01085 and port 23 Management class . Storage class . Volume serial . Device type . Data class . Space units . Primary quantity . Secondary quantity 2 Directory blocks . Record format . Block size . Size . Size . Ata set name type :	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) * (LIBRARY, HFS, PDS, or blank) *
MP a 3 ² Connected to remote server/host 19:35:151:131 using hupped TCP01085 and port 23 Management class . Storage class . Volume serial . Device type . Data class . Space units . Primary quantity . Secondary quantity 2 Directory blocks . Record format . Block size . Secondary quantity . Precord format . Block size . Size .	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) * (LIBRARY, HFS, PDS, or blank) * F7=Backward F8=Forward F9=Swap
Me a 3 ² Connected to remote server/host 129.35.161.131 using hubbool TCP01085 and port 23 Management class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) * (LIBRARY, HFS, PDS, or blank) * F7=Backward F8=Forward F9=Swap
Me a js ² Connected to remote server/host 19:35:161:131 using hupped TCP01385 and port 23 Management class	22/015 (Blank for default management class) (Blank for default storage class) (Blank for system default volume) ** (Generic unit or device address) ** (Blank for default data class) (BLKS, TRKS, CYLS, KB, MB, BYTES or RECORDS) (M, K, or U) (In above units) (In above units) (Zero for sequential data set) * (LIBRARY, HFS, PDS, or blank) * F7=Backward F8=Forward F9=Swap

2) Allocate another dataset UDE00##.JZOS.SAMPLIB under 3.2 with the specified parameters:

parameters:	
File Edit View Communication Actions Window Help	
◙₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	
<u>M</u> enu <u>R</u> efList <u>U</u> tilities <u>H</u> elp	
Data S	et Utility Data set allocated
H HILOCATE NEW data set	L Latalog data set
D Delete entire data set	S Short data set information
blank Data set information	V VSAM Utilities
ISPF Library:	
Project Ente	r "/" to select option
Group Z C	onfirm Data Set Delete
Туре	
Data Set Name /UDE0030 1705	SAMDITR'
Volume Serial	not cataloged, required for option "C")
	not obtologed, required to option of
Data Set Password (If	password protected)
Option == <mark>> <u>a</u></mark>	
F1=Help F2=Split F3=Exit	F7=Backward F8=Forward F9=Swap
F10=Actions F12=Cancel	
MA a	22/015
g)* Connected to remote server/host 129.35.161.131 using lu/pool TCP0 1085 and port 23	
Management class	(Blank for default management class)
Storage class	(Blank for default storage class)
Volume serial	(Blank for system default volume) **
Device type	(Generic unit or device address) **
Data class	(Blank for default data class)
Space units TRKS	(BLKS, TRKS, CYLS, KB, MB, BYTES
· · · · · · · · · · · · · · · · · · ·	or RECORDS)
Average record unit	(M, K, or U)
Primary quantity	(In above units)
Secondary quantity 3	(In above units)
Directory blocks 5	(Zero for sequential data set) *
Record format	
Record length 80	
Block size	
Data set name tupe : PDS	(LIBBARY, HES, PDS, or blank) *
F1=Help F2=Split F3=Exit	F7=Backward F8=Forward F9=Swap
F10=Actions F12=Cancel	
MA	18/026
	18/ 020

3) Allocate another dataset UDE00##.JZOS.PROCLIB under 3.2 with the specified

File Edit View Communica	tion Actions Window Help				
	<u>M</u> enu <u>R</u> efList <u>U</u> tilities <u>H</u> e	lp			
		Data Set Utili	ity	Data set alloca	ated
	A Allocate new data set	C	Catalog da	ata set	
	R Rename entire data set	L	J Uncatalog	data set	
	D Delete entire data set	S	S Short data	a set information	
D	ank Data set information		V VSHM UTILI	ITIES	
IS	PF Library: Project	Enter "/" to	select ont	tion	
	Group	∠ Confirm [Data Set Del	lete	
	Туре				
Ot	her Partitioned, Sequentiat (or vomm Data Se	21:		
	Data Set Name <u>'UDE003</u> Volume Serial	0.JZOS.PROCLIB'	aloged, requ	uired for option "C'	')
Da	ta Set Password	(It password	d protected)		
Or	tion () >				
Up F	1=Help F2=Split F3=	Exit F7=Ba	ackward F8=	Forward F9=Swap	
F1	0=Actions F12=Cancel				
MA a	er/host 129. 35. 16 1. 13 1 using lu/pool TCP0 1085 and port 23			22/015	
MA a ඒ Connected to remote serv	er/host 129,35,161.131 using lu/pool TCP01085 and port 23			22/015	
Mana a	er/host 129.35.161.131 using lu/pool TCP01085 and port 23	(21 - 20	k for dof	22/015	e1255)
MA a 3 ¹ Connected to remote serv Manageme	er/host 129.35.161.131 using lu/pool TCP01085 and port 23	(Blan	k for def k for def	22/015 ault management	class)
Manageme Storage Volume	er/host 129.35.161.131 using lu/pool TCP01085 and port 23	(31an (31an (31an	k for def k for def k for sus	22/015 ault management ault storage cla tem default volu	class) ass) ume) **
MA a 5 ⁹ Connected to remote sen Manageme Storage Volume Device	er/host 129.35.161.131 using W/pool TCP01085 and port 23	(31 an (31 an (31 an (31 an (Gene	k for def k for def k for sys ric unit	22/015 ault management ault storage cla tem default volu or device addres	class) ass) mme) **
MA a Manageme Storage Volume Device Data cla	er/host 129.35.161.131 using lu/pool TCP01085 and port 23	(Blan (Blan (Blan (Gene (Blan	k for def k for def k for sys ric unit k for def	22/015 ault management ault storage cla tem default volu or device addres ault data class)	class) ass) ime) ** is) **
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Manageme Storage Volume Device Data cla Space u Average Primary Seconda Directo Record Record Block s Data se Fi=Hetp F10=Acti MA a g ³ Connected to rem	er/hest 129.35.161.131 using W/pool TCP01085 and port 23 nt class class serial type sss. nits record unit quantity stype ry quantity gry blocks stype stype	(Blan (Blan (Blan (Gene (Blan (BLKS or R (M, K (In a (In a (Zero (LIBR xit F7=	k for def k for sys ric unit k for def , TRKS, C ECORDS) , or U) bove unit bove unit for sequ ARY, HFS, Backward	22/015 ault management ault storage cla tem default volu or device addres ault data class) YLS, KB, MB, BYT s) s) ential data set) PDS, or blank) F8=Forward FS	class) mme) ** ss) ** FES * * = Swap 18/
Manageme Storage Volume Device Data cla Space u Average Primary Seconda Directo Record Record Block s Data se F1=Hetp F10=Acti	er/host 129.35.161.131 using W/pool TCP01085 and port 23	(Blan (Blan (Blan (Blan (BLKS or R (M, K (In a (In a (Zero (-IBRR xit F7=	k for def k for sys ric unit k for def , TRKS, C ECORDS) , or U) bove unit for sequ ARY, HFS, Backward	22/015 ault management ault storage cla tem default volu or device addres ault data class) YLS, KB, MB, BYT s) s) ential data set) PDS, or blank) F8=Forward FS	class) mss) mme) ** ss) ** ES * * = Swap 18/
Manageme Storage Volume Device Data cla Space u Average Primary Seconda Directo Record Record Block s Data se Fi=Hetp F10=Acti MA a 3 ⁹ Connected to rem Call OMVS	er/host 129.35.161.131 using W/pool TCP01085 and port 23 nt class class serial type ssprial type nits record unit quantity 5 ry plocks 5 format FB length 80 ize 27920 t name type PDS F2=Sprit F3=E2 ons F12=Cancel ote server/host 129.35.161.131 using lu/pool TCP00836 and S: Enter	(Blan (Blan (Blan (Blan (BLKS or R (M, K (In a (In a (Zero LIBR xit F7=	k for def k for sys ric unit k for def , TRKS, C ECORDS) , or U) bove unit for sequ ARY, HFS, Backward	22/015 ault management ault storage cla tem default volu or device addres ault data class) YLS, KB, MB, BYT s) s) ential data set) PDS, or blank) F8=Forward FS	class) mme) ** ss) ** ES * * =Swap 18/
Manageme Storage Volume Device Data cla Space u Average Primary Seconda Directo Record Block s Data se Fi=Hetp F10=Acti MA a J' Connected to rem Call OMVS Change to	er/host 129.35.161.131 using W/pool TCP01085 and port 23	(Blan (Blan (Blan (Blan (BLKS or R (M, K (In a (In a (Zero (LIBR ×II F7=	k for def k for sys ric unit k for def , TRKS, C ECORDS) , or U) bove unit for sequ ARY, HFS, Backward	22/015 ault management ault storage cla tem default volu or device addres ault data class) YLS, KB, MB, BYT s) s) ential data set) PDS, or blank) F8=Forward FS	class) mss) mme) ** ss) ** ES * * = Swap 18/
Manageme Storage Volume Device Data cla Space u Average Primary Seconda Directo Record Block s Data se FileActi MA a S ³⁷ Connected to rem Call OMVS Change to cd /u/fhb	er/host 129.35.161.131 using W/pool TCP01085 and port 23 nt class	(Blan (Blan (Blan (Blan (Blan (Blan (Blan (Blan (Blan (Blan (Chene (Blan)(Blan (Blan (Blan (Blan (Blan (Blan (Blan)(Blan (Blan (Blan (Blan (Blan)(Blan (Blan (Blan (Blan)(Blan (Blan (Blan)(Blan (Blan (Blan (Blan)(Blan (Blan)(Blan (Blan)(Blan (Blan)(Blan (Blan)(Blan	k for def k for sys ric unit k for def , TRKS, C ECORDS) , or U) bove unit for sequ ARY, HFS, Backward	22/015 ault management ault storage cla tem default volu or device addres ault data class) YLS, KB, MB, BYT s) s) ential data set) PDS, or blank) F8=Forward FS	class) mss) mme) *** ss) *** ES * * # = Swap 18/
Manageme Storage Volume Device Data cla Space u Average Primary Seconda Directo Record Block s Data se Fi=Hetp F10=Acti Mf a Solution Call OMVS Change to Change to	er/hest 129.35.161.131 using W/pool TCP01085 and port 23 ht class	(Blan (Blan (Blan (Blan (BLKS or R (M, K (In a (In a (In a (Zero (LIBR xit F7= and port 23	k for def k for sys ric unit k for def , TRKS, C ECORDS) , or U) bove unit for sequ ARY, HFS, Backward	22/015 ault management ault storage cla tem default volu or device addres ault data class) YLS, KB, MB, BYT s) s) ential data set) PDS, or blank) F8=Forward F9	class) mme) ** ss) ** ES * * =Swap 18/

7) Enter the following command to extract the JVM 6.0 JZOS load module to your just created load library:

cp -X JVMLDM60 "//'UDE00##.JZOS.LOADLIB(JVMLDM60)'"

8) Change to the samples/jcl directory:

cd samples/jcl

9) Enter the following command to extract the JVM 6.0 PROC to your just created proclib:

cp JVMPRC60 "//'UDE00##.JZOS.PROCLIB(JVMPRC60)'"

10) Enter the following command to extract the JVM 6.0 sample JCL to your just created samplib:

cp JVMJCL60 "//'UDE00##.JZOS.SAMPLIB(JVMJCL60)'"

OPTIONAL:

 To also install JZOS for the JVM 5.0, perform the following steps: Change to the Java 5.0 Home directory: 	
cd /u/fhbmstr/jbatch/local/java/J5.0	
12) Change to the mvstools directory:	
cd mvstools	
13) Enter the following command to extract the JVM 5.0 JZOS load module to your just created load library:	
cp -X JVMLDM50 "//'UDE00##.JZOS.LOADLIB(JVMLDM50)'"	
14) Change to the samples/jcl directory:	
cd samples/jcl	
15) Enter the following command to extract the JVM 5.0 PROC to your just created proclib:	
cp JVMPRC50 "//'UDE00##.JZOS.PROCLIB(JVMPRC50)'"	
16) Enter the following command to extract the JVM 5.0 sample JCL to your just created samplib:	

cp JVMJCL50 "//'UDE00##.JZOS.SAMPLIB(JVMJCL50)'"

End of lab 🙂

4.5 HelloWorld with JZOS

To run your first HelloWorld with JZOS and Java 6.0, perform the following steps.

 Edit the JZOS batch launcher proc contained in 'UDE00##.JZOS.PROCLIB(JVMPRC60)', updating it to point to the JZOS load module library and uncomment this statement.

//JV	/MPRC50 PROC JAVACLS=,	< Fully Qfied Java classRQD
11	ARGS=,	< Args to Java class
11	LIBRARY='UDE00##.JZOS.LOADLIB',	< STEPLIB FOR JVMLDM module
11	VERSION='60',	< JVMLDM version: 60
11	LOGLVL='',	< Debug LVL: +I(info) +T(trc)
11	REGSIZE='OM',	< EXECUTION REGION SIZE
11	I FDADM-!!	

2) Uncomment STEPLIB and save your changes:

```
//JAVAJVM EXEC PGM=JVMLDM&VERSION,REGION=&REGSIZE,
// PARM='&LEPARM/&LOGLVL &JAVACLS &ARGS'
//STEPLIB DD DSN=&LIBRARY,DISP=SHR
//SYSPRINT DD SYSOUT=* < System stdout
//SYSOUT DD SYSOUT=* < System stderr
//STDOUT DD SYSOUT=* < Java System.out
//STDERR DD SYSOUT=*
```

3) Following the instructions contained in 'UDE00##.JZOS.SAMPLIB(JVMJCL60)', tailor the member:

4) SUBMIT the modified JCL and check the job log.

If everything was set up properly, the SYSOUT DD should contain output like this:

```
JVMJZBL1001N JZOS batch Launcher Version: 2.3.0 2008-05-12
JVMJZBL1002N Copyright (C) IBM Corp. 2005. All rights reserved.
java version "1.6.0"
Java(TM) SE Runtime Environment (build jvmmz3160-20081107_25433)
IBM J9 VM (build 2.4, J2RE 1.6.0 IBM J9 2.4 z/OS s390-31 jvmmz3160-
20081107_2543
J9VM - 20081105_025433_bHdSMr
JIT - r9_20081031_1330
GC - 20081027_AB)
JVMJZBL1023N Invoking HelloWorld.main()...
JVMJZBL1024N HelloWorld.main() completed.
JVMJZBL1021N JZOS batch launcher completed, return code=0
```

And the JOB STDOUT DD should contain:

Hello World!

OPTIONAL:

If you want to do the same for Java 5.0 repeat the following steps:

 Edit the JZOS batch launcher proc contained in 'UDE00##.JZOS.PROCLIB(JVMPRC50)', updating it to point to the JZOS load module library and uncomment this statement.

```
//JVMPRC50 PROC JAVACLS=,
// ARGS=,
// LIBRARY='UDE00##.JZOS.LOADLIB',
// VERSION='50',
// LOGLVL='',
// REGSIZE='0M',
// LEPARM=''
```

```
< Fully Qfied Java class..RQD
< Args to Java class
< STEPLIB FOR JVMLDM module
< JVMLDM version: 50
< Debug LVL: +I(info) +T(trc)
< EXECUTION REGION SIZE</pre>
```

6) Uncomment STEPLIB and save your changes:

```
//JAVAJVM EXEC PGM=JVMLDM&VERSION,REGION=&REGSIZE,
// PARM='&LEPARM/&LOGLVL &JAVACLS &ARGS'
//STEPLIB DD DSN=&LIBRARY,DISP=SHR
//SYSPRINT DD SYSOUT=* < System stdout
//SYSOUT DD SYSOUT=* < System stderr
//STDOUT DD SYSOUT=* < Java System.out
//STDERR DD SYSOUT=*
```

 Following the instructions contained in 'UDE00##.JZOS.SAMPLIB(JVMJCL50)', tailor the member:

8) SUBMIT the modified JCL and check the job log.

If everything was set up properly, the SYSOUT DD should contain output like this:

```
JVMJZBL1001N JZOS batch Launcher Version: 2.3.0 2008-05-12
JVMJZBL1002N Copyright (C) IBM Corp. 2005. All rights reserved.
java version "1.5.0"
Java(TM) 2 Runtime Environment, Standard Edition (build pmz31dev-20081210
(SR9-0
IBM J9 VM (build 2.3, J2RE 1.5.0 IBM J9 2.3 z/OS s390-31 j9vmmz3123-20081130
(JI
J9VM - 20081126_26240_bHdSMr
JIT - 20081112_1511ifx1_r8
GC - 200811_07)
JVMJZBL1023N Invoking HelloWorld.main()...
JVMJZBL1024N HelloWorld.main() completed.
JVMJZBL1021N JZOS batch launcher completed, return code=0
```

And the JOB STDOUT DD should contain:

Hello World!

End of lab 🙂

4.5.1 Optional JZOS Lab 1.1 - diagnose problems

1) To diagnose problems with the JZOS batch launcher, change the LOGLVL parameter to '+I' :

// EXEC EXJZOSVM,LOGLVL='+I',

NOTE: Setting this logging level (+1) will dump the environment that is passed to the JVM. The trace level setting "+T" will produce many messages, some of which may be helpful in tracking down installation problems.

End of lab 🙂

4.6 More MVS Java Programs

This chapter covers different Java programs that access native MVS resources. The Java source files for this chapter can be found here: /u/fhbmstr/jbatch/source.

4.6.1 Write to operator console with Java

This chapter shows to write messages to the operator console from Java

2)	Copy /u/fhbmstr/jbatch/source/Wto.java to /u/UDE00##/Wto.java:	
[cp /u/fhbmstr/jbatch/source/Wto.java /u/UDE00##/myjava/Wto.java	
3)	Have a look at the source code:	
	cd /u/UDE00##/myjava oedit Wto.java	
4)	Close the file with F3.	
5)	Compile that file with javac:	
	javac Wto.java -classpath /u/fhbmstr/jbatch/local/java/J6.0/lib/ext/ibmjzos.jar	
6)	Exit the OMVS shell by entering	
[Exit	
7)	Copy the JCL that you have used in chapter 4.5, step 3) into a new JCL 'UDE00##.JZOS.SAMPLIB (WTO)'	
8)	Modify JAVACLS in the JCL:	
	//UDE00##A JOB //PROCLIB JCLLIB ORDER=UDE00##.JZOS.PROCLIB	← JOB-Name
	//JAVA EXEC PROC=JVMPRC60, // JAVACLS='Wto' //STDENV DD *	
	export JAVA_HOME=/u/fhbmstr/jbatch/local/java/J6.0	
9)	Submit the JCL and check the output with SDSF.	

10) Go to the operator console and check for the WTO. It should look similar to this one:

one:	•								
Session B - [2	4 x 80]								- 🗆 🗙
Eile Edit View C	communication <u>A</u> ction	s <u>W</u> indow <u>H</u> elp							
• • • •		🛋 ⊾ 🐱 🖬	a 🗋 🖉	<i></i>					
<u>D</u> ispla	ay <u>F</u> ilter	∼ <u>V</u> iew <u>P</u> r	rint <u>O</u> p	otions <u>H</u> elp					
SDSF SYS	SLOG 636	58.108 MVS:	L MVS1 0)4/25/2007 OW	164322	C	OLUMNS	38 11	.7
COMMAND	INPUT ===	=>					SCROLL	_ ===>	CSR
J0B09345	00000090	\$HASP373	JZOS	STARTED - I	NIT 1	CLA	SS A -	SYS MV	/S1
J0B09345	00000090	IEF403I 、	JZOS - S	STARTED - TIME	=12.34.	58			
J0B09345	00000090	@ZJAV000I	Current	: job is 'JZOS	· .				
J0B09345	00000290						-TIMINO	S (MIN	IS.)
		PAGI	ING COUN	ITS					
J0B09345	00000290	-JOBNAME	STEPNA	AME PROCSTEP	RC	EXCP	CPU	SRB	CLOCK
		PAGE	SWAP	VIO SWAPS					
J0B09345	00000290	-JZOS	JAVA	JAVAJVM	00	3167	.00	.00	.01
		0	0	0 0					
J0B09345	00000090	IEF404I 、	JZOS - E	ENDED - TIME=1	2.34.59				
J0B09345	00000290	-JZOS	ENDED.	NAME-			TOTAL	CPU TI	ME=
		ELAPSED	TIME=	.01					
J0B09345	00000090	\$HASP395	JZOS	ENDED					
	00000090	\$HASP309	INIT 1	INACTIVE *	*****	C=A			
INSTREAM	00000290	LOGON							
TSU09346	00000281	\$HASP100	FHKMSTF	R ON TSOINRDR					
TSU09346	00000090	\$HASP373	FHKMSTF	R STARTED					
F1=HELF	P F2=	=SPLIT	F3=END	F4=RETU	RN F	5=IFIND	F6	S=BOOK	
F7=UP	F8=	=DOWN	F9=SWAF	P F10=LEFT	F1	1=RIGHT	F12	2=RETRI	EVE
MA b								0	05/021
Connected to re	mote server/host 129.	35.161.131 using lu/pool	TCP00142 and po	ort 23					//

4.6.2 Handling condition codes with Java

This chapter shows to write create a little Job net based on Java return codes.



```
//HELLO EXEC PROC=JVMPRC60,
// JAVACLS='HelloWorld'
//STDENV DD *
# This is a shell script which configures
# any environment variables for the Java JVM.
# Variables must be exported to be seen by the launcher.
. /etc/profile
export APP_HOME=/u/UDE00##/myjava
export JAVA_HOME=/u/fhbmstr/jbatch/local/java/J6.0
export PATH="$PATH":"${JAVA_HOME}"/bin:
LIBPATH="$LIBPATH":"${JAVA_HOME}"/bin
LIBPATH="$LIBPATH":"${JAVA_HOME}"/bin/classic
LIBPATH="$LIBPATH":"${JZOS_HOME}"
export LIBPATH="$LIBPATH":
# Customize your CLASSPATH here
CLASSPATH=$APP_HOME
export CLASSPATH="$CLASSPATH":
# Set JZOS specific options
# Use this variable to specify encoding for DD STDOUT and STDERR
#export JZOS_OUTPUT_ENCODING=Cp1047
# Use this variable to prevent JZOS from handling MVS operator commands
#export JZOS_ENABLE_MVS_COMMANDS=false
# Use this variable to supply additional arguments to main
```

#export JZOS_MAIN_ARGS=""
Configure JVM options
IJO="-Xms16m -Xmx128m"
IJO="\$IJO -Djzos.home=\${JZOS_HOME}"
Uncomment the following if you want to run without JIT
#IJO="\$IJO -Djava.compiler=NONE"
Uncomment the following if you want to run with Ascii file encoding
IJO="\$IJO -Dfile.encoding=ISO8859-1"
export IBM_JAVA_OPTIONS="\$IJO "
export JAVA_DUMP_HEAP=false
export JAVA_PROPAGATE=NO
//*************************************
// ENDIF
///******
//

- 9) Submit the JCL and check the output with SDSF.
- 10) Modify ARGS='0' in the JCL
- 11) Again, submit the JCL and check the output with SDSF. The HelloWorld should **not** be invoked.

End of lab ©

4.7 Tomcat with JZOS

The Apache Tomcat servlet container can be installed quickly and easily using the JZOS toolkit.

1)	Create a new directory /u/fhbmstr/jbatch/users/UDE00##	
	<pre>mkdir /u/fhbmstr/jbatch/users/UDE00##</pre>	
2)	Download the .zip version of the binary distribution of Tomcat and upload it (in binary mode) to /u/fhbmstr/jbatch/users.	
	Apache Jakarta download page: <u>http://jakarta.apache.org/site/binindex.cgi</u> binary .zip distribution: http://tomcat.apache.org/download-55.cgi	
	Note: You can also find the binary zip installation files in the /u/fhbmstr/jbatch/setup directory and copy it directly to your home directory /u/UDE00##!	
	cp /u/fhbmstr/jbatch/setup/apache-tomcat-5.5.15.zip /u/fhbmstr/jbatch/users/UDE00##	
3)	From a z/OS Unix shell, change to your home directory extract the Tomcat zip file	э.
	Note : this will create a directory "apache-tomcat-5.5.15" under the current directory!	
	cd /u/fhbmstr/jbatch/users/UDE00## jar -xvf apache-tomcat-5.5.15.zip	
4)	Delete the zip file:	
	rm apache-tomcat-5.5.15.zip	
5)	For convenience, create a symbolic link to the Tomcat distribution:	
	ln -s apache-tomcat-5.5.15 tomcat	
	Note: You can now use "tomcat" instead of "apache-tomcat-5.5.15".	
6)	Modify ports in server.xml:	
	 Download /u/fhbmstr/jbatch/users/UDE00##/apache-tomcat- 5.5.15/conf/server.xml via FTP in binary mode 	
	 Edit server.xml on your local workstation and change the http port depending on your userid, i.e. change 8080 to 80## 	
	 Upload the modified server.xml to /u/fhbmstr/jbatch/users/UDE00##/users/apache-tomcat- 5.5.15/conf/server.xml via FTP in binary mode. 	
7)	Create a new member TOMCAT in the dataset UDE00##.JZOS.SAMPLIB' and insert the following JCL content:	
	<pre>//TOMCAT JOB //PROCLIB JCLLIB ORDER=UDE00##.JZOS.SAMPJCL // //JAVA EXEC PROC=JVMPRC50, // JAVACLS='org.apache.catalina.startup.Bootstrap', // ARGS='start' //STDENV DD * # This is a shell script which configures # any environment variables for the Java JVM.</pre>	

```
# Variables must be exported to be seen by the launcher.
    /etc/profile
   export TOMCAT_HOME=/u/fhbmstr/jbatch/users/UDE00##/apache-tomcat-5.5.15
   export JAVA_HOME=/u/fhbmstr/jbatch/local/java/J5.0
   export PATH=/bin:"${JAVA_HOME}"/bin:
   LIBPATH=/lib:/usr/lib:"${JAVA_HOME}"/bin:"$JAVA_HOME"/bin/classic
   LIBPATH="$LIBPATH":"${JZOS_HOME}"
   export LIBPATH="$LIBPATH":
   CLASSPATH="${JAVA_HOME}/lib/tools.jar"
   CLASSPATH="$CLASSPATH":"${TOMCAT_HOME}/bin/bootstrap.jar"
   CLASSPATH="$CLASSPATH":"${JZOS_HOME}/jzos.jar"
   CLASSPATH="$CLASSPATH":"${TOMCAT_HOME}/bin/commons-logging-api.jar"
   export CLASSPATH="$CLASSPATH":
   # Set JZOS specific options
   # Use this variable to specify encoding for DD STDOUT and STDERR
   #export JZOS_OUTPUT_ENCODING=Cp1047
   # Use this variable to prevent JZOS from handling MVS operator commands
   #export JZOS_ENABLE_MVS_COMMANDS=false
   # Use this variable to supply additional arguments to main
   #export JZOS_MAIN_ARGS=""
   # Configure JVM options
   # Note that Tomcat requires default ASCII file.encoding
   IJO="-Xms64m -Xmx128m"
   IJO="$IJO -Dfile.encoding=ISO8859-1"
   IJO="$IJO -Djzos.home=${JZOS_HOME}"
   IJO="$IJO -Dcatalina.base=${TOMCAT_HOME}"
   IJO="$IJO -Dcatalina.home=${TOMCAT_HOME}"
   IJO="$IJO -Djava.io.tmpdir=${TOMCAT_HOME}/temp"
   IJO="$IJO -Djava.endorsed.dirs=${TOMCAT_HOME}/common/endorsed"
   # Uncomment the following if you want to run without JIT
   #IJO="$IJO -Djava.compiler=NONE"
   export IBM_JAVA_OPTIONS="$IJO "
   export JAVA_DUMP_HEAP=false
   export JAVA_PROPAGATE=NO
   export IBM_JAVA_ZOS_TDUMP=NO
Submit the JCL
                                                                               9) Check results with SDSF:
   STDOUT DD should contain something like this (but will vary depending on the
   JDK version):
```



10) Test Tomcat: Go to http://129.35.161.131:80##/ This should bring up the Tomcat administration page:

Apache Tomcat/5.5.15 - Micro	ssoft Internet Explorer
File Edit View Favorites Tools	Hop
🔇 Back + 🐑 · 💌 🗟 (🟠 🔎 Sawah 👷 Farantias 🕐 Mada 🔗 🎯 🔜 🔜 🛄 🗱 😫 😐
Address () https://0.155.67.228c0000/	× B 00
Google -	🖌 🖸 Suche 🔹 🤣 Parriers 🗿 Soldadiert 👋 Rechtschreibanühng 🔹 🌉 Optionen 🖉
Apache T	omcat/5.5.15
CATE	The Anache Jakarta Project
XIX	http://jakarta.aojeche.org/
Administration	If you're seeing this page via a web browser, it means you've setup Tomcat successfully. Congratulations!
Status	As you may have guessed by now, this is the default Torncat home page. It can be found on the local filesystem at:
Tomcat Manager	\$CATALINA_HOME/webapps/ROOT/index.jsp
	where "SCATALINA_HOME" is the root of the Torncat installation directory. If you're seeing this page and you don't think you should be then either you're either a
Documentation	user who has arrived at new installation of Torncat, or you're an administrator who hasn't got his/her setup oute right. Providing the latter is the case, please refer to the Torgent Documentation for more detailed value and administration information than is found in the INSTALL file.
Release Notes	The second
Change Log Torricat Documentation	NOTE: This page is precompiled. If you change it, this page will not change since it was compiled into a servlet at build time. (See scattalize_scott/vebages/zoott/vebage
Tomast Online	NOTE: For security reasons, using the administration webapp is restricted to users with role "admin". The manager webapp is restricted to users with role "manager". Users are defined in source and second (construction and the construction a
Home Barro	
FAQ Bug Database	Included with this release are a host of sample Servlets and JSPs (with associated source code), extensive documentation (including the Servlet 2.4 and JSP 2.0 API JavaDoc), and an introductory guide to developing web applications.
Open Bugs Users Mailing List	Tomcat mailing lists are available at the Tomcat project web site:
Developers Mailing List IRC	 users@tomcat.apache.org for general questions related to configuring and using Tomcat dev@tomcat.apache.org for developers working on Tomcat
-	Thanks for using Tomcall
Examples	Powered by
JSP Examples Sendet Examples	C W
WebDAV capabilities	X
	ToMCAT Capyright © 1999-2005 Apache Schware Foundation
Miccellaneous	All Rights Reserved
Cusia Java Casara Dagan City	
Sun's Serviet Site	s

11) Purge the TOMCAT Job

Note: Please ask your instructor to purge tomcat job for you, you won't have enough authority to do that on the system.

4.7.1 Install JZOS Samples

1) To deploy applications, you first of all have to install the Tomcat Admin Page: unzip the /u/fhbmstr/jbatch/setup/apache-tomcat-5.5.15-admin.zip to your Tomcat home:

```
Cd /u/fhbmstr/jbatch/users/UDE00##
jar -xvf /u/fhbmstr/jbatch/setup/apache-tomcat-5.5.15-admin.zip
```

- 2) Download /u/fhbmstr/jbatch/users/UDE00##/apache-tomcat-5.5.15/conf/tomcatusers.xml in binary mode via FTP to your workstation.
- Add the following lines in the xml file: <role rolename="admin"/> <role rolename="manager"/> ...

<user username="admin" password="manager" roles="admin,manager"/>

- 4) Save the tomcat-users.xml file and upload again to the host in binary mode to /u/fhbmstr/jbatch/users/UDE00##/apache-tomcat-5.5.15/conf
- 5) Restart Tomcat by submitting the TOMCAT job again.
- 6) Install and test JZOS servlet examples: Download the jzos.war from /u/fhbmstr/jbatch/setup to your local workstation and deploy it with the Tomcat Manager on the admin page (Login with username "admin" and password "manager").

7) After deploying the .war file, go to http://129.35.161.131:80xx/jzos and test the servlet examples.

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kinera 🔄 -tupo//d.155.57.22555000(upp)			× 🔿 a
loogle - 🔄 🖂 tate 🔹 g	🖇 📴 🚰 😳 Nordert 🛛 👋 Rethrutheligning 🔹 🍕 😋	toe Ø	
	JZ	OS Servlet and JSP Examples	
sese serviets and JSPs demonstrate how Tomcat int oto: As with the general Tomcat examples, these er	teracts with JZO5 and 2/OS facilities. samples will only work when viewed via an http URL. Th	ey will not work if you are viewing these pages via a "Herr"" URL,	
xample	Execute	Notes	
Example Jello World	Execute	Notes This will run only if Tomost has been properly installed under 1205 Sec. <u>1708 Tomost instifiction</u> for details	
ixauqole Ielio Warid 2008 Iugin	Execute Execute	Notes This will not only if Tourcet has been properly installed under J2DS Kerr <u>ACDs Tourcet modulation</u> for thinks Shows the arrow MVS user and earned Johnson: This will run only if Tourcet has been properly antiled under J2DS Kerr <u>ACDS Tourcet modulations</u> for thinks	
innuple Lello Warld SKIN logis Tils antrinous ness	Execute Execute Execute Execute	Notes This will not only if Touccut has been properly installed order DDNS Not <u>ACON formations for distain</u> . Nonew for an entry ACON issue and cannot dolumnin. This will rea odd if Touccut has been properly astisled under DDNS Not <u>ACON formations for distain</u> . This complete all deploy the attentions for details. HIS Stemmar, DNN or DD.	
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Example Selle Fastid 2020S lugin Hila exteriment had Linggang teet TTO teet	Execute Execute Execute Execute Execute	Notes This will use only if Tourcut has been properly installed maker JODS. See <u>JAMES Tourcut insuffactors</u> for density. Shows the interior MANS use and search Johnson. This will rea odd by Tourcoi and See are provely antibiled under JAMES New <u>JAMES Tourcut insuffactors</u> for themes. This exceptly and theplay the statements in the specifical HISS Stemark, DSN or DD. Loops a message through logi (justing the LowConsol.dignords. Thes will not only If Tourcoi has been properly installed under JZOS and the DJ file and Jone Logg is many process on the VMB-IN-V6/file directory of this websate. This exceptle will send a message to the system log. Also, invoking this JM and educating a message, check the log for the centre.	
Example Letto Warld Frank Ingia Mile anti-time nex Loggney test TTO test DB/2 JIDBC test	Execute Execute Manualy Execute Execute Execute	Notes This will not only if Toncos has been poperly installed only 2018 Not <u>(ACR) tomos basis</u> for duration Notes that any one NMN says and another distance. This will run only if Tomos has been properly attilled under 2018 Not <u>(ACR) tomos basis</u> for duration (This council, and the duration duration of the duration (This council degradies) the software for duration (This council degradies). This will run only if Tomos has been poperly in the duration with the NM for directory of the websate. This example will send a message to the system los. Allow invoking the ARM on durating a message, check the log for the sends. This example will send a message to the system los. Allow invoking the ARM on durating a message, check the log for the sends. This example will and only of DD2 and IDDC have been properly configurables tomos in Non <u>Confugurations</u> DD2 ND5 Internation.	

8) Purge the TOMCAT Job

Note: Please ask your instructor to purge tomcat job for you, you won't have enough authority to do that on the system.

End of lab 🙂

Appendix

A1 Basic FTP Tutorial

This tutorial explains how to use FTP for downloading files from the host.

- 1) In Windows, select **Start** \rightarrow **Run** \rightarrow Enter **cmd** and press Enter.
- 2) In the command line, enter ftp 129.35.161.131



- 3) Enter UDE00## as username and <your password> as password.
- 4) Enter **Icd <local_dir>** to change to your local workstation directory where you want to place your downloaded files.
- 5) Enter **bin** to use binary mode.
- 6) Enter **cd** <**host_dir**> to change to the host directory where you want to download the files from.
- 7) Enter get <destination_file> to get the desired file.
- 8) If you have finished downloading all files, enter quit to leave the FTP session

A2 Java Syntax

Further information on Java can be found here:

- Handbuch der Java-Programmierung: <u>http://www.javabuch.de/</u> (German)
- Java ist auch eine Insel and Java 2 und Praxisbuch Objektorientierung: <u>http://www.galileocomputing.de/openbook</u> (German)

A3 z/OS Basics

A good introduction to z/OS basics can be found in the redbook *Introduction to the New Mainframe: z/OS Basics* under http://www.rodbooks.ibm.com/abstracts/sg246366.html2Opon

http://www.redbooks.ibm.com/abstracts/sg246366.html?Open

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