WebSphere Application Server v8.5

Liberty Profile – JPA Test

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1) IBM WAS V8.5 Liberty Profile - JPA 설정

1. 이번 강좌에서는 IBM WAS V8.5 Liberty Profile을 이용해서 JPA 애플리케이션을 테스트 해보도록 하겠 습니다. 해당 테스트를 위해서 먼저 server.xml > 기능 관리자에서 Add를 클릭하여 jpa-2.0 기능을 추가 합니다.

(jpa의 경우에는 당연히 datasource를 이용해서 DB Connection을 해야하기 때문에 jdbc-4.0 기능도 같 이 포함되어야 합니다. 또한 JDBC 연결 부분의 설정은 지난 강좌인 JDBC 테스트를 참고하시기 바라겠 습니다.)



2) JPA Sample 개발

1. IBM WAS V8.5 Liberty Profile을 이용해서 JPA 를 테스트하기 위하여 간단하게 JPA Sample 애플리케이 션을 개발 해보도록 하겠습니다. 먼저 왼쪽 탭에서 마우스 우 클릭하여 New > JPA Project를 선택합니다.

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Enterprise E 🔀	vvAR ≱ Applic	Services Construction Server V8.5 L	server.xml /** /* public T supe // T }	Htt Htt () ODO	ervletjava 🛛 pServlet#HttpServlet() Servlet() { ; Auto-generated constructor =
		New	⊜ /**	2	Project
		Show In	Alt+Shift+W ►	6	OSGi Application Project
	1100	Сору	Ctrl+C	æ	OSGi Bundle Project
	iiii	Copy Qualified Name		128	Application Client Project
		Paste	Ctrl+V	1000	Connector Project
	24	Delete	Delete	63	Dynamic Web Project
		Import	Þ		Enterprise Application Project
	n Su	Export		1	JPA Project
	2	Refresh	FS		Static Web Project
			// T		Web Fragment Project
				S	Web Project
			3		Example

2. JPA Project 마법사가 나오면 JPATest 라는 이름을 입력하고 Target runtime과 Configuration을 하단과 같이 설정한 후 다음을 클릭합니다.

New JPA Project	
PA Project Configure JPA project settings.	JPA
Project name: JPATest	
Project location	
Use default location	
Location C:#Users#juwlee#liberty362#JPATest	Browse
Target r <u>u</u> ntime	
WebSphere Application Server V8.5 Liberty Profile	◆ New <u>R</u> untime
<u>C</u> onfiguration	
Minimal JPA 2.0 Configuration	▼ Mod <u>i</u> fy
Working sets	them Floject
Add project to working sets	
Working sets	✓ Select
	inish Cancel

3. Source folder의 위치를 확인하고 다음을 클릭합니다.

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ava		
Configure proj		
ource folders	on build path:	
🐸 src		Add Folder
		Edit
		<u>Remove</u>
	folder:	
efault output		
efault output ouildWclasses		
efault output ouild₩classes		
efault output xuild₩classes		

4. JPA Facet 화면을 확인한 후 DB Connection을 생성하기 위하여 Add connection을 클릭합니다.

Configure JPA	settings.	JPA
<u>P</u> latform		
RAD JPA 2.0	Platform	ă ▼
JPA implemen	tation	
Type: Library	Provided by Target Runtime	
The targeted ro option will cor	untime is able to provide the library requi nfigure the project to use that library.	red by this facet. Selecting this
<u>Connection</u>		
<none></none>		×¥
		Add connection
Add driver	library to build path	Connect
Driver:		*
Override de	fault catalog from connection	
Catalog:		
Override de	fault schema from connection	
<u>S</u> chema:		*
Persistent clas	s management	
O Discover an	notated classes a <u>u</u> tomatically	
Annotated	classes must be <u>listed in persistence.xml</u>	
Create <u>m</u> ap	ping file (orm.xml)	
n		

5. Connection Profile 화면이 나오면 설정하고자 하는 DB를 선택하고 다음을 클릭합니다.

(이번 강좌에서는 이미 언급한 것처럼 DB2를 사용하도록 하겠습니다.)

onnection Profile	~
Create a DB2 for Linux, UNIX, and Windows connection profile.	
Connection Profile Types:	
type filter text	
DB2 for Linux, UNIX, and Windows DB2 for 15/OS DB2 for z/OS Derby Generic JDBC HSQLDB Informix Ingres MaxDB MySQL Oracle PostgreSQL Concent	
	+
Ja <u>m</u> e:	
New DB2 for Linux, UNIX, and Windows	
escription (optional):	
Back Next > Einish	Cancel

6. Drivers 선택화면이 나오면 아직 만들어둔 Driver가 없으므로 오른쪽 끝에 있는 New Driver를 클릭합니다.

New Connection Profile	
Specify a Driver and Connection Details	
 Define and select a driver from the drop-down list to continue. 	
Drivers:	•] 🐨 🛆
Properties	New Dr
Connect when the without completes	Test Connection
Sonnect when the wizard completes	[Iest Connection]
Sonnect when the wizard completes Connect every time the workbench is <u>s</u> tarted	[Iest Connection]
Sonnect when the wizard completes Connect every time the workbench is started	[Test Connection]

7. Driver Template에서 IBM Data Server Driver for JDBC를 클릭하고 JAR List를 선택합니다.

Unable to loc Files₩IBM₩SQ	ate JAR/zip in file sys LLIB₩java₩db2jcc.ja	stem as specified by the driver definition.	on: C:\Program
Jame/Type JA	R List Properties		
vailable driver	templates:		
Name	*	System Vendor	System Version
Detabase			
Database			
IBM Da Other D	ta Server Driver for J Driver	DB2 for Linux, UNIX, and Windows DB2 for Linux, UNIX, and Windows	V9.1 V9.1
IBM Da Other D	ta Server Driver for J priver	C DB2 for Linux, UNIX, and Windows DB2 for Linux, UNIX, and Windows	V9.1 V9.1
Difference of the second secon	ta Server Driver for J Driver	C DB2 for Linux, UNIX, and Windows DB2 for Linux, UNIX, and Windows	V9.1 V9.1
Driver name:	ta Server Driver for J Driver	DB2 for Linux, UNIX, and Windows DB2 for Linux, UNIX, and Windows	V9.1 V9.1
Driver game: IBM Data Serve Driver type:	ta Server Driver for J briver er Driver for JDBC an	DB2 for Linux, UNIX, and Windows DB2 for Linux, UNIX, and Windows	V9.1 V9.1

8. JAR List에서 DB2의 JDBC Driver jar 파일을 확인하고 설치되어 있는 정상적인 위치로 변경하고 OK를 클릭합니다.



9. 세부 정보 화면에서 Host와 Port를 확인하고 User name과 Password를 입력합니다.

Properties		
General Tracing	Optional	12
Databa <u>s</u> e:	SAMPLE	
Host:	localhost	
Port number:	50000	
Use client auth	nentication	
User name:		=
Password:		
Save password	1	
Default schema:		
Connection URL:	jdbc:db2://localhost:50000/SAMPLE:retrieveMessagesFro mServerOnGetMessage=true;	

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10. 설정이 다 되었으면 Test Connection버튼을 클릭하여 정상적으로 ping이 되는지 확인합니다. Ping이 성공적으로 완료되면 Driver 설정을 무사히 완료하신 것 입니다.

ivers: IBM Data Se	erver Driver for JDBC and SQL -	ŧ
General Tracing	Optional	
Database:	SAMPLE	-1
Host:	localhost	- 11
Port number:	50000	-11
Use client auth	nentication	
User n <u>a</u> me:	juwlee	
Password:	*******	
Save password	1	
Default schema:		
Connection UR <u>L</u> :	jdbc:db2://localhost:50000/SAMPLE:retrieveMessagesFro mServerOnGetMessage=true;	~
		- -
<u>Connect when the</u>	wizard completes	nnec
Connect even/ time	a the workbench is started	
Connect even/ time	a the workbench is started	

11. 새롭게 정의한 Connection이 정상적으로 입력된 것을 확인하고 완료를 클릭합니다.

New JP	Project	
IPA Fac	et	IDA
Configure	JPA settings.	
Platform		
RAD JP	2.0 Platform	
JPA imp	ementation	
Type: Li	brary Provided by Target Runtime	•
The targory	ted runtime is able to provide the library required by this fa- ill configure the project to use that library.	cet. Selecting this
Connect	on	
New DE	2 for Linux, UNIX, and Windows	•
	2	Add connection
		Connect
<u>A</u> dd o	river library to build path	
Driver:	IBM Data Server Driver for JDBC and SQLJ	*
Overr	de default catalog from connection	
Catalog:		*
Overr	de default schema from connection	
<u>S</u> chema:	JUWLEE	-
Persister	t class management	
O Disco	ver annotated classes a <u>u</u> tomatically	
Anno	ated classes must be listed in persistence.xml	
Create	<u>m</u> apping file (orm.xml)	
?	< <u>B</u> ack Next > <u>Einish</u>	Cancel

12. JPATest 애플리케이션의 기본 프로젝트가 생성된 것을 확인합니다. 다음으로 DB에서 만들어진 Table 을 기반으로 자동으로 JPA관련 Entity class를 생성하기 위하여 마우스 우 클릭하여 JPA Tools > Generate Entities from Tables을 선택합니다.

(JPA를 생성하는 다양한 방법이 있지만 여기서는 Table 기반으로 Entities를 만드는 방식을 테스트로 사용하며 다른 방법들은 JPA Programming 부분이기 때문에 다른 자료를 참고하시기 바라겠습니다.)



13. Entities 마법사가 나오면 이전에 만든 connection을 선택하고 원하는 Schema와 Table을 선택하고 다음을 클릭합니다.

Generate d	Custom Entities	
Select Tal	bles	
Select table	s to generate entities from.	
Connection:	New DB2 for Linux, UNIX, and Windows	- [
	(Note: You must have an active connection to select schema.)	
<u>S</u> chema:	JUWLEE	•]
Iables: ☑ Update c	ACT CATALOG CL_SCHED CUSTOMER DB2ACCOUNT DEPARTMENT EMPLOYEE EMPPROJACT EMP_PHOTO EMP_PHOTO EMP_RESUME IN_TRAY ORG PRODUCT PRODUCT PRODUCT PROJECT PROJECT PROJECT PUNCHASEORDER Bass list in persistence.xml	re Defaults
?	< <u>B</u> ack <u>N</u> ext > <u>Finish</u>	Cancel

14. 테이블 연관관계입력 부분에서는 그냥 다음을 클릭합니다.

Generate Custom Entities				
Table Associations				
Edit a table association by sel	ecting it and modifying	the controls in the	he editing par	nel.
Table <u>a</u> ssociations				
				34
-				
?	< <u>B</u> ack]	Vext >	Einish]	Cancel

15. Entity Generation 부분에서는 패키지명만 입력하고 다음을 클릭합니다.

rable mapping		
Key generator:	none	
Sequence <u>n</u> ame:		
	You can use the patterns \$table and/or \$pk in the These patterns will be replaced by the table name column name when a table mapping is generated.	sequence name and the primary key
Entity access:	Eield C Property	
Associations fetch:	Default C Eager Lazy	
Collection properties	s type: 🔘 java.util.Set 💿 java.util.List	
Always generate	optional JPA annotations and DDL parameters	
Source fol <u>d</u> er: JPAT Pac <u>k</u> age: ©com Superclass:	est/src .Ibm.juwlee.jpa	Browse Browse
interfaces:		
		Remove

16. 요약화면을 확인하고 문제가 없다면 Finish를 클릭하여 Table에서 Entity 생성을 시작합니다.

stomize Indiv	idual Entities	
bles and column		
EMPLOYEE		
Table mapping		
<u>C</u> lass name:	Employee	
Key generator:	none	
Entity <u>a</u> ccess:	Vou can use the patterns \$table and/or \$pk in the These patterns will be replaced by the table name column name when a table mapping is generated. <u>Eield</u> <u>Property</u>	sequence name. and the primary key
Domain java cla	s	
Superclass: java	lang.Object	Brows <u>e</u>
Interfaces:		<u>A</u> dd
		[<u>B</u> emove

17. 정상적으로 상단의 작업이 완료되었으면 하단과 같이 Table이 자동으로 Entity class로 생성된 것을 하단과 같이 확인할 수 있습니다.



18. 또한 OR Mapping 설정 정보인 persistence.xml이 제대로 생성된 것을 확인하고 connection 탭에서 사용할 JTA data source 이름에 JDBC Datasource의 JNDI 이름을 넣어줍니다.

(여기서는 지난 강좌에서 미리 만들어둔 jdbc/db2ds를 사용하도록 하겠습니다.)

JPA - JPATest/src/META-INF/persistence.xml - Eclipse						
<u>File E</u> dit <u>N</u> avigate Se <u>a</u> rch <u>P</u> roject <u>R</u> un <u>W</u> indow <u>H</u> elp						
🗂 • 🗟 🖻 💼 🔅 • 🖸 • 💁 🖶 🎯 •	🤹 + 😕 😂 🛷	- 🛛 🐼 🗍	b • 6 • ♥ ♦ •	• \$\$ •		
Project Explorer 🛛 🕞 🔄 👘 🏱 🗖 🗖	🔊 server.xml 🛛 🚺 T	estServlet.java	🚺 Employee.java	🖶 persistence.xml 😣	- 8	
⊯ JPATest ♦ JPA Content	Connection				(?)	
persistence.xml	Persistence Unit Con Configure the data so	nection urce or JDBC cor	nection properties.			
i IRE System Library (iava 1 7 64)	Transaction type:	Default (JTA)		•	
WebSphere Application Server V8.5 Liberty Profile [W	Database					
🧀 build	JTA data source:	jdbc/db2ds				
JPATestEAR	Non-JTA data sourc	CB)				
Server V8.5 Liberty Profile	IDBC connection properties					
	Populate from con	nection				
	Driver:				Browse	
	URL:					
	User					
	Password.					
	1 <u>0</u> 5					
۰ <u>ااا</u>	General Connection O	ptions Properties	Source			



19. 이렇게 하시면 테스트를 위한 JPA Sample 애플리케이션 작성을 정상적으로 완료하신 것 입니다.

3) JPA Sample 테스트

1. 지금 까지 만든 JPA Sample 애플리케이션을 테스트하기 위하여 간단하게 동적 웹 프로젝트를 하나 작성합니다.

	HIGHLIN MARK	📾 🧚 🕶 🖸 🕶 💁 🖝 😫 🎯	- 🥶 - 🤭	e -	🛷 🔹 🛛 🐼 👘 🖾 👻 🖓 🔹 🌾 🍕
Project Ex	plorer	23 📄 📚 🖙 🖓	Server.xml	23	🕐 TestServlet.java 💦 📝 Employee.j.
	stEAR		🗈 Server	Col	nfiguration: server2 (server.)
TestSe	ervletv	VAR Application Server V8.5 Liberty Profile	Configuratio	on St	ructure
			Define the g	nain	contents of the configuration in this
		New	•	2	Project
		Show In	Alt+Shift+W ►	C\$	OSGi Application Project
	TIER .	Сору	Ctrl+C	B	OSGI Bundle Project
	Him	Copy Qualified Name		128	Application Client Project
		Paste	Ctrl+∨	100	Connector Project
	24	Delete	Delete	C3	Dynamic Web Project
		Import		62	EJB Project
	10 10	Export		6	Enterprise Application Project
	Conselling of the second			A	JPA Project
	1	Retresh	F5	3	Static Web Project
					Web Fragment Project
					Web Project
				C 3	Example
			Desites Course		Other Ctrl . N
New Dy	vnami c We stand	c Web Project b Project alone Dynamic Web project or add it	to a new or existin	ng Er	nterprise Application.
Project I	stand	c Web Project b Project alone Dynamic Web project or add it JPATestWAR on	to a new or existin	ng Er	nterprise Application.
Project I View Dynamic Create a Project I View Use	stand locatio defau	c Web Project b Project alone Dynamic Web project or add it JPATestWAR on It location	to a new or existin	ng Er	nterprise Application.
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New Dy Synamic Create a l Project n Project n Project n Dynamic 3.0 Configu Default Add to EAR proj Working Working	voami stand istand iocatii defau icca icca untim here 2 c web icca starti starti project projec g sets g sets	c Web Project b Project alone Dynamic Web project or add it JPATestWAR on It location WUsersWjuwleeWilberty362WJPATestW/ e Application Server V8.5 Liberty Profile b module version liguration for WebSphere Application : ng point for working with WebSphere cets can later be installed to add new ship to an EAR ame: JPATestEAR set to working sets c	to a new or existin AR Server V8.5 Liberty Application Serve functionality to th	y Pro	biterprise Application. Browge New Buntime bitle Modify Select Select Select

2. 만들어진 동적 웹 프로젝트에서 JPA Sample 애플리케이션을 호출하는 Servlet을 작성합니다.

File Edit Navigate Search Project Run	Window Help		
📫 ▼ 🔛 🐚 🗁 🗟 🏇 ▼ 🗿 ▼ 🍳 📽 Enterprise E 😂 📌 Services 🛛 🗖	▼ 🔯 ▼ 🞯 ▼ 🔮	🖻 🙆 Test:	∋ 🛷 👻 🚳 🚑 🔯 🧃 Servlet.java 📄 🖸 Employee.ja
	🐁 Server Config	ura	tion: server2 (server.x
 JPATest JPATestEAR JPATestWAR JPATestWAR JPATestWAR JPATestWAR EJBs Filter Mappings Filters Clistener References Security roles Servlet Mappings 	Configuration Structu Define the main conter type filter text Server Config 같 기능 관리 전 HTTP 엔드 토깅 및 애플리케 왕 공유 라이	ure ents o gurati 자 드포인 이션 브러	of the configuration in this section ion I트 모니터링 리
Java Resou New	Data Sou	E9	Project
JavaScript Resources Geometry WebContent		6	Servlet
> 2 TestServletWAR		69	Servlet Mapping
▷ → webspriere Application Server V8.5 L.		2	Example
		2	Other Ctrl+N

WebSphere. software

```
Create Servlet
                                                                 - 0 .
 Create Servlet
 Specify class file destination.
 Project:
             JPATestWAR
                                                                 -
 Source folder: #JPATestWAR#src
                                                                    Browse...
 Java package: com.ibm.juwlee.jpa
                                                                    Browse...
 Class name: SearchJPAServlet
 Superclass:
              javax.servlet.http.HttpServlet
                                                                    Brows<u>e</u>...
 Use an existing Servlet class or JSP
 Class name: SearchJPAServlet
                                                                    Browse...
  ?
                      < Back
                                Next >
                                              ٦ ٢
                                                    Einish
                                                                   Cancel
protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOP
   ServletOutputStream out = response.getOutputStream();
   response.setContentType("text/html");
   out.println("<html><head><title>Hello World</title></head>");
   out.println("<body><h1>Hello World!!!</h1><br>");
   try {
       Employee e = SearchEmployee("000010");
       out.println("Hello " + e.getFirstnme());
   } catch (Exception e) {
       // TODO Auto-generated catch block
       e.printStackTrace();
   3
   out.println("</html>");
3
@PersistenceUnit(unitName = "JPATest")
private EntityManagerFactory emf;
@Resource
private javax.transaction.UserTransaction utx;
protected Employee SearchEmployee (String EmpNo) throws Exception {
     utx.begin();
     EntityManager em = emf.createEntityManager();
     Employee employee = (Employee) em.find(Employee.class, EmpNo);
```

```
if (employee == null) {
    utx.commit();
    em.close();
    throw new Exception ("Employee is not found... EmpNo is " + EmpNo);
    utx.commit();
    em.close();
    return employee;
}
```

```
- 12 -
```

3. 해당 애플리케이션을 WAS에 배포하기 위하여 만들어진 프로젝트를 전부 빌드 합니다.



4. 빌드된 애플리케이션을 IBM WAS Liberty Profile 에 배포합니다.

Description:		New		•	
Managed Classes		Open		F3	
XML Mapping Files		Show In		Alt+Shift+W ►	
JAR Files		Сору		Ctrl+C	
		Paste		Ctrl+V	
	*	Delete		Delete	
		Rename		F2	
	***	Debug		Ctrl+Alt+D	
		Start		Ctrl+Alt+R	
	S	Profile			
	1999	Stop		Ctrl+Alt+S	
	ELD	Publish		Ctrl+Alt+P	
		Clean			
	1 Carr	Add and Remo	ve		
		Monitoring		•	
General Connection Options Pr	operties	Clean Server or	Next Start		
🛃 Markers 🔲 Properties 🕼 Se	rvers 🖂	Utilities		•	tions ⊑
B Web Preview Server [Stop	ped]	Properties		Alt+Enter	
WebSphere Application Se	erver V8.5 Lib	perty Prome at iou	amost [server2] [stopped, syn	cnronized]
Add and Remove	erver.xml] ne	ew server			
 Server Configuration [s Add and Remove Add and Remove Modify the resources that are configuration Move resources to the right to configurate the resources to the right the resources the	erver.xml] ne onfigured on	ew server in the server em on the server			
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Server Configuration [s Add and Remove Add and Remove Modify the resources that are co Move resources to the right to c Available: JPATestWAR	erver.xml] ne	the server	figured:	J.R.	
Server Configuration [s Add and Remove Add and Remove Modify the resources that are co Move resources to the right to c Available: JPATestWAR	onfigured on	the server	figured:	J.R.	
Server Configuration [s Add and Remove Add and Remove Modify the resources that are co Move resources to the right to c Available: JPATestWAR	onfigured on configure the	the server	figured:	R	
Server Configuration [s Add and Remove Add and Remove Modify the resources that are co Move resources to the right to c Available: JPATestWAR	onfigured on configure the Ad	the server	figured: <i>IPATestEAR</i> TestServletWA	JR	
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Control Configuration Configu	onfigured on configure the	the server	figured: <i>IPATestEAR</i> TestServletWA	IR	
Control Configuration Configu	erver.xml] ne	ew server	figured:	J.R.	
Server Configuration [s] Add and Remove Add and Remove Modify the resources that are control of the right to control of th	onfigured on configure the Ad	the server	figured:	IR III	
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Server Configuration [s] Add and Remove Add and Remove Modify the resources that are conditioned by the resources to the right to conditioned by the resources that are conditioned by the resources that ar	onfigured on configure the Ad < Re Add < Re	a the server a the server a the server a the server a con a	figured: <i>IPATestEAR</i> TestServletWA	JR	
Control Configuration Configu	onfigured on configure the Ad Add Add	a the server a the server a on the server <u>Con</u> <u>d</u> a on <u>All >></u> <u>move All</u> diately	figured: <i>IPATestEAR</i> TestServletWA	JR III	
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5. 배포가 완료되면 테스트를 위하여 IBM WAS Liberty Profile을 시작 시킵니다.

Persistence provider:			
Description:		New	
Managed Classes		Open	F3
N YMI Manning Files		Show In	Alt+Shift+W
A Mile Mapping Tiles	B	Сору	Ctrl+C
> JAK Files	1	Paste	Ctrl+V
	×	Delete	Delete
		Rename	F2
	**	Debug	Ctrl+Alt+D
	0	Start	Ctrl+Alt+R
	ø⁼	Profile	
	1001	Stop	Ctrl+Alt+S
	60	Publish	Ctrl+Alt+P
		Clean	
	8	Add and Remove	
		Monitoring	
General Connection Options Properties Source	-	Clean Server on Next Start	
🖞 Markers 🔲 Properties 🦚 Servers 🙁 🙀 Data Source Explorer 🖺 Snippet:	s	Utilities	
B Web Preview Server [Stopped]		Properties	Alt+Enter
WebSphere Application Server V8.5 Liberty Profile at localhost [server2] [Stop [Stop]	oppea,	synchronizedj	
(e) JPATestEAR [Stopped, Synchronized]			
Server Configuration [server xm]] new server			

6. 테스트를 위해서 만들어둔 Servlet에서 마우스 우 클릭하여 Run As > Run on Server를 클릭하여 해당 Servlet을 수행합니다.

日 역 9	<u> </u>	General	10 P				
🔁 JPATest		Grand					
JPATesteak		General		- 11-1			
JPATestWAR JAX-WS Web Services		New	*	-			
JPATestWAR Java Resources		Open Type Hierarchy	F4	-			
▲ C [#] STC		Show In	Alt+Shift+W ►	-			
🖌 🌐 com.ibm.juwlee.jpa		Open	F3				
SearchJPAServlet.		Open With	*				
A Libraries A JavaScript Resources	D	Сору	Ctrl+C				
WebContent	Ð	Copy Qualified Name					
🔁 TestServletWAR	A	Paste	Ctrl+V				
B WebSphere Application Server	×	Delete	Delete				
	<u>8</u>	Remove from Context	Ctrl+Alt+Shift+Down				
		Build Path	•				
		Source	Alt+Shift+S 🕨				
		Refactor	Alt+Shift+T ►				
	2	Import					
	4	Export					
	8	Refresh	F5				
		References	*				
		Declarations	•	-	×		
		Run As	•		1 Run on Server		Alt+Shift+X, F
		Debug As		50	2 Run on Mobile Brows	er Simulator	
		Profile As	*		Run Configurations		
		Validate			Run configurations		

7. 하단과 같이 정상적으로 DB가 조회되어서 하단처럼 나오면 JPA Sample 테스트가 성공적으로 완료하 신 것 입니다 .



[INFO] SRVE0242I: [JPATestEAR] [/JPATestWAR] [com.ibm.juwlee.jpa.SearchJPAServlet]: 초기화를 완료했습니다.

4) 결론

이번 강좌에서 IBM WAS V8.5 Liberty profile을 통한 JPA Sample 테스트를 수행하였습니다.

JPA 프로그래밍 자체가 조금 어렵기는 하지만 이번 강좌를 통해서 IBM WAS Liberty Profile를 이용하여 JPA 애플리케이션을 작성하고 운영하는 것은 그렇게 어렵지 않습니다. 설정하시는 것도 강좌를 통해서 확인해 보셨지만 JPA 기능만 추가하면 나머지 부분은 JDBC 테스트와 거의 동일합니다. 다시 말씀드려서 개발하기 참~ 쉽죠?

그럼 이번 강좌는 마무리하고 다음 강좌를 통해 IBM WAS V8.5의 다양한 장점을 더 만나보도록 하겠습니다. Go Go !!!

9) 참고 자료

- 1. 이 가이드는 IBM WAS V8.5 최초 사용자를 위한 기본 가이드 입니다.
- IBM WAS 자체에 아직 익숙하지 않으신 분들은 가급적 기본강좌인 '하나씩 쉽게 따라 해보는 IBM WAS v7' 강좌를 먼저 읽고 이 강좌를 읽으시는 것이 훨씬 이해에 됩니다. (http://www.websphere.pe.kr/xe/?mid=was_info_re&page=3&document_srl=800)
- 3. 가급적 IBM WAS V8.5 InfoCenter의 해당 카테고리를 한 번 읽어보고 난 후에 작업하시기 바라 겠습니다.
- InfoCenter WebSphere Application Server V8.5 (http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/index.jsp)
- InfoCenter JPA for WebSphere Application Server (http://pic.dhe.ibm.com/infocenter/wasinfo/v8r5/topic/com.ibm.websphere.base.doc/ae/cejb_jpan ote.html?resultof=%22%6a%70%61%22%20)