

# Power Week 2025

18 - 19 - 20 novembre 2025

IBM Innovation Studio Paris

#pw2025

## S65 - Web-Services avec SQL

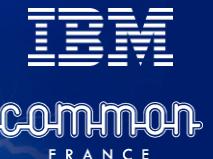
20 novembre 11:15 - 12:15

Birgitta Hauser

Birgitta Hauser – Modernization – Education – Consulting on IBM I

eMail: [Hauser@ModEdCon.com](mailto:Hauser@ModEdCon.com) / [Hauser@SSS-Software.de](mailto:Hauser@SSS-Software.de)

Web: <https://ModEdCon.com>



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## Agenda

### Introduction

### Créer un serveur de services web

- Tip: Modification du fichier httpd.conf

### Créer des services web RESTful SQL

### Exemples



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# Introduction

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## Qu'est-ce qu'un service Web?

**Une méthode simple pour connecter des points d'extrémité (endpoints)**

- Envoyer une requête et recevoir une réponse

**Services (Web), aussi appelés API (= Application Programming Interface)**

**→ Programmes ou procédures appelés à travers le Web**

- Exécuter l'action demandée
- Retourner les données demandées

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## Types de services web

### SOAP (Simple Object Access Protocol)

- Standardisé
- Basé sur XML (toujours XML)
  - Chaque opération est explicitement définie avec le format XML de la requête ainsi que le format de la réponse
  - Chaque paramètre d'entrée est lié à un type de données → fortement typé
- Utilise WDSL (Web Service Description Language) comme moyen de contact entre le consommateur et le fournisseur
  - Peut être considéré comme une méthode de signature

### REST (Representational State Transfer)

- Aucun format standard
- Simplicité
- Echange de données
  - JSON (mais aussi XML, HTML YAML ...) peuvent être utilisés
- Data driven
- Stateless communications protocol (http)
  - HTTP types de demande:
    - GET (Récupérer des données)
    - POST (Ajouter de nouvelles données)
    - PUT (Actualiser les données)
    - DELETE (Supprimer des données)

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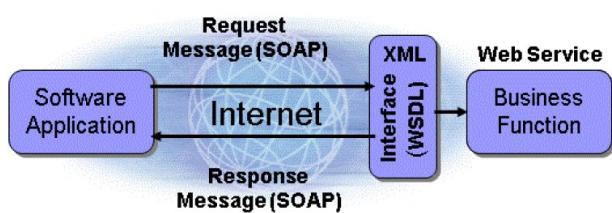
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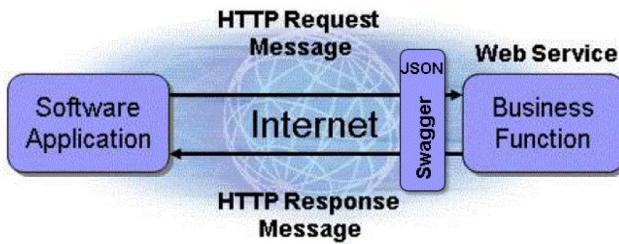
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## Types de services Web

### • Service Web SOAP



### • Service Web RESTful



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## Les bases des services Web RESTful

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### Utilisation explicite des méthodes HTTP :

- **GET** Récupérer des données depuis le serveur
- **POST** Envoyer des données au serveur
- **PUT** Remplacer des données ou créer une nouvelle ressource
- **DELETE** Supprimer une ressource

Sans état → Statelessness

### URI (Uniform Resource Identifier) de type structure de répertoire

- Utilisation de noms (au lieu de verbes)
- Exemples: **GET /customers** – Afficher tous les clients  
**POST /customers/4711** – Ajouter Client 4711 (avec POST request body)

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## Déployer des services web sur IBM i

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### HTTP Web Administration Interface

- Pour enregistrer des programmes ou des procédures écrits dans une HLL (tel que RPG, Cobol ou C) comme service web RESTful (Representational State Transfer) ou SOAP (Simple Object Access Protocol), pour qu'ils puissent être appelés via le Web.
- Instructions SQL peuvent être enregistrées comme services web RESTful, pendant que Db2 for i agit comme serveur de services RESTful.

Now RELEASE 7.4 TR 1

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# Créer un serveur de services web

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## Start TCP/IP Server (STRTCPSSVR) – Instance du serveur \*ADMIN

```
Start TCP/IP Server (STRTCPSSVR)
Type choices, press Enter.

Server application . . . . . > *HTTP          *ALL, *AUTOSTART...
+ for more values
Restart server . . . . .    *NONE           *NONE *HTTP *DNS *OMPROUTED *C
HTTP server:
  Server instance . . . . . > *ADMIN        Name, *ALL, *ADMIN
  Instance startup values . . . *NONE

Work with Subsystem Jobs      DEV740
Subsystem . . . . . : QHTTPSSVR   20-05-05 12:06:32 UTC
Type options, press Enter.
  2=Change 3=Hold 4=End 5=Work with 6=Release 7=Display message
  8=Work with spooled files 13=Disconnect

F3=Exit F4=Prompt Opt Job      User      Type      ----Status---- Function
F24=More keys
  --- ADMIN  QTMHHTTP BATCH  ACTIVE  PGM-QZBMAIN
  --- ADMIN  QTMHHTTP BATCHI ACTIVE  PGM-QZSRLOG
  --- ADMIN  QTMHHTTP BATCHI ACTIVE  PGM-QZSRHTTP
  --- ADMIN  QTMHHTTP BATCHI ACTIVE  PGM-QZSRCG1
  --- ADMINL QLWISVR  BATCHI ACTIVE  JVM-/QIBM/Prod
  --- ADMIN2 QLWISVR  BATCHI ACTIVE  JVM-/QIBM/Prod
  --- ADMIN3 QLWISVR  BATCHI ACTIVE  JVM-/QIBM/Prod
  --- ADMIN4 QWEBADMIN BATCHI ACTIVE  JVM-/QIBM/Prod

Parameters or command
==>
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F11=Display schedule data
F12=Cancel F17=Top F18=Bottom
```

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- Démarrer l'instance du HTTP Serveur \*ADMIN dans le sous-système QHTTPSSVR

- l'instance du HTTP Serveur \*ADMIN est activé

Select Job_Name_Short as Job, Job_User as User, Job_Type, Job_Status, Trim(function_Type) concat ' ' concat Trim(function) Function From Table (QSYS2.ACTIVE_JOB_INFO(RESET_STATISTICS >> 'NO', SUBSYSTEM_LIST_FILTER => 'QHTTPSSVR', JOB_NAME_FILTER >> 'ALL', CURRENT_USER_LIST_FILTER >> 'ALL', DETAILED_INFO >> 'NONE')) a Where Job_Name_Short like '%ADMIN%' Order By SUBSYSTEM, JOB_NAME_SHORT, RUN_PRIORITY, JOB_NUMBER;				
JOB	USER	JOB_TYPE	JOB_STATUS	FUNCTION
ADMIN	QTMHHTTP	BCH	SIGN	PGM-QZBMAIN
ADMIN	QTMHHTTP	BCI	SIGN	PGM-QZSRLOG
ADMIN	QTMHHTTP	BCI	SIGM	PGM-QZSRHTTP
ADMIN	QTMHHTTP	BCI	TIMW	PGM-QZSRCG1
ADMIN1	QWEADMIN	BCI	THDW	JVM-/QIBM/Prod
ADMIN2	QWEADMIN	BCI	THDW	JVM-/QIBM/Prod
ADMIN3	QWEADMIN	BCI	THDW	JVM-/QIBM/Prod
ADMIN4	QWEADMIN	BCI	THDW	JVM-/QIBM/Prod
ADMINS	QLWISVR	BCI	THDW	JVM-/QIBM/Prod

More...  
F3=Exit F4=Prompt F5=Refresh F9=Retrieve F11=Display schedule data  
F12=Cancel F17=Top F18=Bottom

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## Créer un serveur de services Web

Démarrer le Navigator for i (de l' ACS)

Bookmarks → IBM Web Administration for i

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## Créer un nouveau serveur de services Web

Choisir: Create a New Web Service Server

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## Créer un nouveau serveur de services Web

**IBM Web Administration for i**

Welcome HAUSER

Setup Manage | Advanced | Related Links

Common Tasks and Wizards

- Create Web Services Server
- Create HTTP Server
- Create Application Server

**Create Web Services Server**

Specify Web services server name - Step 1 of 5

Welcome to the Create Web Services Server wizard. A Web services server provides a secure and easy way to configure an environment for hosting Web services that are based on IBM i objects such as RPG and COBOL programs and SQL statements. This wizard creates everything needed to run Web services.

For more information, please visit: <https://www.ibm.com/support/pages/node/633935>

Specify a unique name for this server 

Server name: BHATEST03

Server description: Web services server created by the Create Web Services Server

Create HTTP server

- Enregistrer le nom et la description du serveur WebService

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## Créer un nouveau serveur de services Web

**IBM Web Administration for i**

Welcome HAUSER

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Common Tasks and Wizards

- Create Web Services Server
- Create HTTP Server
- Create Application Server

**Create Web Services Server**

Specify network attributes for server - Step 2 of 5

Your server may listen for requests on specific IP addresses or on all IP addresses of the system. A command port is used to manage the server.

Specify internet addresses and ports for server 

Specify server command port: 10023

Specify internet address and port for the server

IP address: All IP addresses

Port: 10022

Specify internet address and port for the HTTP server

IP address: All IP addresses

Port: 10032

- Les prochains ports sont déterminés automatiquement
- Les ports peuvent être précisés individuellement, mais doivent > 5000 ou, mieux encore, compris entre 20000 et 65535

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## Créer un nouveau serveur de services Web

**IBM Web Administration for i**

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**Create Web Services Server**

Specify subsystem for server - Step 3 of 5

Specify the operating environment for the server's jobs by specifying work management attributes the controls what subsystem is used to run the server's jobs. The default values for work management attributes will result in server jobs running in subsystem QHTTPSVR.

Path to job description: /QSYS.LIB/QHTTPSVR.LIB/QZHBHTTP.JOBD or... Browse

Path to job queue: \*JOBQ or... Browse

Routing data: \*JOBD or...

- peut être accepté comme il est

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## Créer un nouveau serveur de services Web

**IBM Web Administration for i**

Welcome HAUSER

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**Create Web Services Server**

Specify User ID for Server - Step 4 of 5

The server requires an IBM i user ID to run the server's jobs. It is recommended that a special user ID is specified to run the server's jobs since this user ID is given authority to all of the server's objects, such as files and directories.

Specify user ID for this server:

Use default user ID  
 Specify an existing user ID  
 Create a new user ID

User ID: WSERVICX

• Spécifier un user id existant:  
User profile qui exécutera les jobs serveur

• Créer une nouvel User Id:  
Créera un nouveau profil utilisateur sans lancer l'écran 5250

- Utiliser le User Id par défaut :  
QWSERVICE livré avec l'état \*DISABLED et le mot de passe \*NONE  
→ Avant de l'utiliser, il faut l'activer (\*ENABLED) et ajouter un mot de passe (commande CL : CHGUSRPRF)

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## Créer un nouveau serveur de services Web - Résumé

The screenshot shows two windows of the IBM Web Administration interface. The left window is titled 'Create Web Services Server' (Summary - Step 5 of 5) and displays configuration details for 'Web Services Server Information' and 'HTTP Server Information'. The right window shows the server 'BHATEST03' in the 'Creating' state under the 'Application Servers' tab.

**Left Window: Create Web Services Server (Summary - Step 5 of 5)**

- Web Services Server Information:**
  - Server name: BHATEST03
  - Server description: Web services server created by the Create Web Services Server wizard.
  - Port: 10022
  - Command port: 10023
  - Server root: /www/BHATEST03
  - Server URL: http://[REDACTED]:10032
  - User ID for server: WSERVICX
  - Context root: /web
  - Job queue: \*JOB0
  - Job description: QHTTPPSVR/QZHBHTTP
  - Subsystem: QHTTPPSVR/QHTTPPSVR
  - Routing data: \*JOB0
- HTTP Server Information:**
  - HTTP server name: BHATEST03
  - HTTP server description: Web services server created by the Create Web Services Server wizard.
  - Port: 10032
  - Document root: /www/BHATEST03/mdocs
  - Server root: /www/BHATEST03
  - Server association: BHATEST03
  - Job queue: \*JOB0
  - Job description: QHTTPPSVR/QZHBHTTP
  - Subsystem: QHTTPPSVR/QHTTPPSVR
  - Routing data: \*JOB0

**Right Window: Application Servers**

- Server: BHATEST03 - V2.6 (web services)
- Status: Creating
- Message: Server 'BHATEST03' is in the process of being created. To update the status, click the Refresh icon above.

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## Travailler avec des Services Web

The screenshot shows the 'Manage All Servers' page. It lists various servers including Admin1 through Admin5, AJSP, and several BHATEST servers. The table includes columns for Server, Version, Status, Address:Port, and Description. Buttons at the bottom allow for Refresh, Start, Stop, Restart, Manage Details, Delete, and Rename operations.

Server	Version	Status	Address:Port	Description
Admin1	V8.5 (int app svr)	Running	*:2002	
Admin2	V8.5 (int app svr)	Running	*:2004,2005	
Admin3	V8.5 (int app svr)	Running	*:2006,2007	
Admin4	V8.5 (int app svr)	Running	*:2008	
Admin5	V8.5 (int app svr)	Running	*:2011	
AJSP	V8.5 (int app svr)	Stopped	*:8211	
<b>BHATEST03</b>	V2.6 (web services)	Running	*:10022	Web services server created by the Create Web Services Server wizard.
BHAWSQL01	V2.6 (web services)	Running	*:10000	WebServices based on SQL Statements
BHAWSQL02	V2.6 (web services)	Running	*:10011	Web services server created by the Create Web Services Server wizard.

**Bottom Navigation:**

- Refresh, Start, Stop, Restart
- Manage Details, Delete, Rename

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## Répertoires IFS pour serveur Web

 /www/BHATEST03 on BHAEDEV.RZKH.DE

File Edit View Actions

BHAEDEV.RZKH.DE   Filter

Directory  
/www/BHATEST03

Icon	Name	Size (KB)	Last Modified
	conf		August 15, 2025 at 3:10:26 PM GMT+2
	htdocs		August 15, 2025 at 11:28:46 AM GMT+2
	iasCreateBHATEST03.properties	1	August 15, 2025 at 11:28:47 AM GMT+2
	logs		August 15, 2025 at 11:29:05 AM GMT+2
	webservices		August 15, 2025 at 11:28:48 AM GMT+2
	wlp		August 15, 2025 at 11:28:46 AM GMT+2

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Fichier de configuration httpd.conf

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## Modifier le fichier de configuration

```

Listen *:10032
DocumentRoot /www/BHATEST03/htdocs
TraceEnable Off

DefaultNetCCSID 1208
DefaultFSCCSID 1141

#=====
# Access Logs and Error Logs
#=====

LogFormat "%h %T %l %u %t \"%r\" %s %b \"%{Referer}i\" \"%{User-Agent}i\" combined"
LogFormat "%{Cookie}n \"%r\" %t" cookie
LogFormat "%{User-agent}i" agent
LogFormat "%{Referer}i - %\" referer"
LogFormat "%l %u %t \"%r\" %s %b" common

CustomLog logs/access/access_log combined
ErrorLog logs/error/error_log

```

- Manage → Http Servers

- Choisir le Serveur

- Modifiez le fichier de configuration en UTF-8 (CCSID 1208)

### Commande CL:

```
CHGATR OBJ('/www/BHATEST03/conf/httpd.conf')
        ATR(*CCSID)
        VALUE(1208)
```

- Display/Edit Configuration File



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## Modifier le fichier de configuration

```

Listen *:10032
DocumentRoot /www/BHATEST03/htdocs
TraceEnable Off

DefaultNetCCSID 1208
DefaultFSCCSID 1141

#=====
# Access Logs and Error Logs
#=====

LogFormat "%h %T %l %u %t \"%r\" %s %b \"%{Referer}i\" \"%{User-Agent}i\" combined"
LogFormat "%{Cookie}n \"%r\" %t" cookie
LogFormat "%{User-agent}i" agent
LogFormat "%{Referer}i - %\" referer"
LogFormat "%l %u %t \"%r\" %s %b" common

CustomLog logs/access/access_log combined
ErrorLog logs/error/error_log

```

- Le Port et le Document Root sont déterminés automatiquement

- DefaultNetCCSID doit toujours être 1208 (=UTF-8)

- DefaultFSCCSID (CCSID par défaut) peut être défini  
→ 1141=EBCDIC allemand avec €



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## Modifier le fichier de configuration

```
#=====
# GZIP Options
#=====

LoadModule deflate_module /QSYS.LIB/QHTTPSRV.LIB/QZSRCORE.SRVM

#LoadModule mod_ibm_lwi /QSYS.LIB/QHTTPSRV.LIB/QLWIHSMOD.SRVM
#LoadModule was_ap20_module /QSYS.LIB/QHTTPSRV.LIB/QSVTAP24.SRVM

# Insert Filter for Content Types except Images
AddOutputFilterByType DEFLATE text/html text/plain text/xml text/css text/javascript application/javascript application/json application/xml

# Compression Level Highest 9 - Lowest 1
DeflateCompressionLevel 1

ExpiresActive On

ExpiresDefault "modification plus 1 seconds"

ExpiresByType image/gif "access plus 1 days"
ExpiresByType image/jpg "access plus 1 days"
```

- Utiliser du nouveau JavaScript si la dernière modification date de plus d'une seconde
- Seulement pour les applications Web

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## Modifier le fichier de configuration

```
#=====
# E-Tag
#=====

Header unset ETag
FileETag None

#=====
# Directories
#=====

DirectoryIndex index.html

<Directory />
    Require all denied
</Directory>

<Directory /www/BHATEST03/htdocs>
    Require all granted
</Directory>
```

- Default: Seulement pour les applications Web
- Default: Seulement pour les applications Web
- Default: L'accès à tout répertoire est rejeté
- Default: Seul le répertoire /www/BHATEST03/htdocs est accessible

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## Modifier le fichier de configuration – Programmation Web

```
#=====
# Aliases
#=====

Alias /codebase/          /home/apps/codebase/
Alias /test/               /home/apps/test/

#-----
#--- Programs
#-----
ScriptAliasMatch /testpgm/(.*) /qsys.lib/test.lib/$1

<Directory /qsys.lib/test.lib>
  SetEnv QIBM_CGI_LIBRARY_LIST "TEST;TEST_DTA;SYSTOOLS;WEBSRVUTL"
  AuthType Basic
  AuthName "Test Applications"
  PasswdFile %SYSTEM%
  UserID %CLIENT%
  Require valid-user
</Directory>
```

- Programmation Web: symbolic link pour **codebase**
  - Programmation Web: symbolic link pour **application test**
  - Appeler des programmes avec toutes sortes d'extensions
  - Bibliothèque programme - **\$1** tout programme
- Utiliser une bibliothèque **séparée** qui contient **TOUS** les programmes appelés **via le Web!**

- Liste des bibliothèques
- Authentification par rapport au User Profile (IBM i)

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## Déployer un nouveau service Web (SQL)

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## Déployer un nouveau service Web: Step 1 of 8

IBM Web Administration for i

Welcome HAUSER

Setup | Manage | Advanced | Related Links

All Servers | HTTP Servers | Application Servers | Installations

Server: BHATEST03 - V2.6 (web services)

Common Tasks and Wizards

Web Services

- Deploy New Service
- Manage Deployed Services

Server Properties

- Properties
- View HTTP Servers
- Security
- Logging
- View Logs
- View Create Summary

Tools

- Web Log Monitor
- Create Certificate
- Manage Certificates
- Create Keystore

Deploy New Service

Specify Web service type - Step 1 of 8

Welcome to the Deploy New Service wizard. This wizard helps you create Web services using IBM i objects and data. A SOAP-based Web service is a self-contained software component with a well-defined interface that describes a set of operations that are accessible over the Internet and exchange XML messages that are based on the SOAP protocol. A REST-based Web service exposes resources, where client requests are handled by resource methods and the format of messages that are exchanged is defined by the resource itself.

Specify Web service type: REST

Specify Web service implementation:

- ILE program object as a Web service
- SQL as a Web service

Specify database properties that will be used to process SQL statements:

Database system: localhost or...  
Default schema: \*LIBL or...  
Naming convention: \*SYS  
Library list: qtemp, comsqlqry, sysools, qgpl

• Choisir un serveur WebService

• Choisir: Deploy New Service

• Web Service Type: REST  
SOAP

• Implémentation: \*PGM/\*SRVPGM  
\*SQL

• \*SQL implémentation uniquement pour les services REST

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## Déployer un nouveau service Web: Step 1 of 8

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Welcome HAUSER

Setup | Manage | Advanced | Related Links

All Servers | HTTP Servers | Application Servers | Installations

Server: BHATEST03 - V2.6 (web services)

Common Tasks and Wizards

Web Services

- Deploy New Service
- Manage Deployed Services

Server Properties

- Properties
- View HTTP Servers
- Security
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- View Logs
- View Create Summary

Tools

- Web Log Monitor
- Create Certificate
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Deploy New Service

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- ILE program object as a Web service
- SQL as a Web service

Specify database properties that will be used to process SQL statements:

Database system: localhost or...  
Default schema: \*LIBL or...  
Naming convention: \*SYS  
Library list: qtemp, comsqlqry, sysools, qgpl

• Database System

• Naming Conventions:  
▪ System ou SQL Naming Conventions

• Default Schema pour SQL Naming Conventions  
▪ Q'un seul schéma peut être cherché pour accéder aux objets de la base de données non qualifiés

• Liste des bibliothèques pour System Naming Conventions  
▪ La liste des bibliothèques est recherchée  
▪ Les bibliothèques listées sont séparées par des virgules

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## Déployer un nouveau service Web: Step 2 of 8

IBM Web Administration for i

Welcome HAUSER

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
  - Properties
  - View HTTP Servers
- Security
  - Logging
  - View Logs
  - View Create Summary
- Tools
  - Create Certificate
  - Manage Certificates
  - Create Keystore

**Deploy New Service**

Specify Name for Service - Step 2 of 8

The Web service to be externalized is a resource. The URI path template identifies matching patterns for incoming HTTP requests. The path is relative to the context root and can be a simple string or one or more template parameters that can contain regular expressions to further restrict what is allowed. ?

Resource name:	BHAWXSQLTest
Service description:	Test Webservice SQL
URI path template:	/Sales e.g. /temperature, /temperature/{temp:id+}

- Nom de la ressource : Nom de l'appel
- Description
- Template de chemin URI paramètres inclus

Resource name:	BHAWXSQLTest
Service description:	Test Webservice SQL
URI path template:	/Sales/{SalesYear:id+} e.g. /temperature, /temperature/{temp:id+}



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## Déployer un nouveau service Web: Step 3 of 8

IBM Web Administration for i

Welcome HAUSER

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
  - Properties
  - View HTTP Servers
- Security
  - Logging
  - View Logs
  - View Create Summary
- Tools
  - Create Certificate
  - Manage Certificates
  - Create Keystore

**Deploy New Service**

Specify security constraint - Step 3 of 8

The security constraint limits who can access the web service. ?

Secure transport required:	No
Protect using authentication method:	*NONE
	*NONE
	*BASIC

- Secure Transport: Yes/No → https:// or http://
- Méthode d'authentification:
  - \*NONE: Tous les utilisateurs peuvent utiliser le service Web
  - \*BASIC: Seuls les utilisateurs authentifiés



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## Déployer un nouveau service Web: Step 4 of 8

**IBM Web Administration for i**

Welcome HAUSER

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
- View HTTP Servers
- Security
- Logging
- View Logs
- View Create Summary
- Tools
  - Create Certificate
  - Manage Certificates
  - Create Keystore

BHATEST03 > Manage Deployed Services > Deploy New Service

**Deploy New Service**

Specify SQL Statements - Step 4 of 8

Specify SQL statements that will be externalized as a Web service: ?

Procedure name	SQL statement/Parameter name
<input checked="" type="checkbox"/> AllSales	Select * From Sales

Add Remove Remove All Continue Insert from example

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**• Spécifier l'API/le service Web**  
**• Plusieurs API peuvent être spécifiées**

**• Instruction SQL:**

- SELECT (GET Method)
- UPDATE (POST Method)
- INSERT (POST/PUT Method)
- DELETE (DELETE Method)
- CALL Stored Procedure
- VALUES: Calling an UDF  
GET\_CLOB\_FROM\_FILE  
GET\_BLOB\_FROM\_FILE

**• Une instruction SQL peut contenir des Parameter Markers (?) pour les valeurs des paramètres.**

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## Déployer un nouveau service Web: Step 4 of 8 (Continue)

**IBM Web Administration for i**

Welcome HAUSER

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
- View HTTP Servers
- Security
- Logging
- View Logs
- View Create Summary
- Tools
  - Create Certificate
  - Manage Certificates
  - Create Keystore

BHATEST03 > Manage Deployed Services > Deploy New Service

**Deploy New Service**

Specify SQL Statements - Step 4 of 8

Specify SQL statements that will be externalized as a Web service: ?

Procedure name	SQL statement/Parameter name	Usage	Data type
<input checked="" type="checkbox"/> SalesCust	Select Year(SalesDate) SalesYear, CustNo, Sum(Amount) From Sales Where Year(SalesDate) = ? and CustNo = ? Group By Rollup(Year(SalesDate), CustNo) Order By SalesYear, CustNo	ParSalesYear ParCustNo	input INTEGER input CHAR

Add Remove Remove All Continue Insert from example Back Next Cancel

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**• SQL Instruction avec plusieurs Parameter Markers (?)**  
**• Les paramètres sont listés en bas avec des noms par défaut : PARM00001, PARM00002 ...)**  
**→ Peut être modifié!**

**• Le type de données est automatiquement déterminé par les métadonnées.**

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## Déployer un nouveau service Web: Step 4 of 8 (Résumé)

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Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
  - Properties
  - View HTTP Servers
  - Security
  - Logging
  - View Logs
  - View Create Summary
- Tools
  - Web Log Monitor
  - Create Certificate
  - Manage Certificates
  - Create Keystore

**Deploy New Service**

Specify SQL Statements - Step 4 of 8

Specify SQL statements that will be externalized as a Web service: [?](#)

Procedure name	SQL statement/Parameter name	Usage	Data type
SalesCust	Select Year(SalesDate) SalesYear, CustNo, Sum(Amount) From Sales Where Year(SalesDate) = ? and CustNo = ? Group By Rollup(Year(SalesDate), CustNo) Order By SalesYear, CustNo	input	INTEGER
	ParSalesYear	input	CHAR
	ParCustNo	input	CHAR

Add Remove All

- Résumé de toutes les procédures enregistrées avec toutes les informations
  - Instructions SQL
  - Paramètres
- Ajouter des nouvelles procédures
- Supprimer toutes les procédures
- Modifier une procédure existante

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## Déployer un nouveau service Web: Step 5 of 8

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Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
  - Properties
  - View HTTP Servers
  - Security
  - Logging
  - View Logs
  - View Create Summary
- Tools
  - Web Log Monitor
  - Create Certificate
  - Manage Certificates
  - Create Keystore

**Deploy New Service**

Specify SQL Information - Step 5 of 8

Customize how each procedure will process SQL statements. For query statements, this includes the type of result sets that may be returned and how pagination is handled for result sets. [?](#)

Procedure name: SalesCust

SQL Statement:

```
Select Year(SalesDate) SalesYear, CustNo,
       Sum(Amount)
  From Sales
 Where Year(SalesDate) = ?
   and CustNo = ?
 Group By Rollup(Year(SalesDate), CustNo)
 Order By SalesYear, CustNo
```

SQL result type: Multi-row result set ▾

Trim mode for output fields: Trailing ▾

SQL state information in response: On errors ▾

Treat warnings as SQL Errors: Yes ▾

User-defined error message:

HTTP status code on SQL success: 200 ▾

HTTP status code on SQL failure: 500 ▾

- Instruction SQL avec Parameter Markers
- Type de résultat SQL :
  - Multi-row result set (Arrays)
  - Single-row result set (Objects)
  - Media resource Images / Documents PDF
- Trim mode for output fields
  - Trailing Supprimer les caractères suivants
  - Leading Supprimer les caractères de début
  - Both Supprimer les caractères précédents et suivants
  - None Ne pas supprimer des caractères

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## Déployer un nouveau service Web: Step 5 of 8

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Setup Manage Advanced | Related Links

Welcome HAUSER

Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
- Properties
- View HTTP Servers
- Security
- Logging
- View Logs
- View Create Summary
- Tools
- Web Log Monitor
- Create Certificate
- Manage Certificates
- Create Keystore

Procedure name: SalesCust  
SQL Statement:

```
Select Year(SalesDate) SalesYear, CustNo,
       Sum(Amount)
  From Sales
 Where Year(SalesDate) = ?
   and CustNo = ?
 Group By Rollup(Year(SalesDate), CustNo),
          Order By SalesYear, CustNo
```

SQL result type: Multi-row result set  
Trim mode for output fields: Trailing ▾

SQL state information in response: On errors  
Treat warnings as SQL Errors: Yes  
User-defined error message:

HTTP status code on SQL success: 200  
HTTP status code on SQL failure: 500

- SQL State information in response:
  - Never Jamais
  - Always Toujours
  - On Errors en cas d'erreur
- Traiter les warnings comme des erreurs
  - Yes
  - No
- Message d'erreur défini par l'utilisateur

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## Déployer un nouveau service Web: Step 5 of 8

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Setup Manage Advanced | Related Links

Welcome HAUSER

Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

- Web Services
  - Deploy New Service
  - Manage Deployed Services
- Server Properties
- Properties
- View HTTP Servers
- Security
- Logging
- View Logs
- View Create Summary
- Tools
- Web Log Monitor
- Create Certificate
- Manage Certificates
- Create Keystore

Procedure name: SalesCust  
SQL Statement:

```
Select Year(SalesDate) SalesYear, CustNo,
       Sum(Amount)
  From Sales
 Where Year(SalesDate) = ?
   and CustNo = ?
 Group By Rollup(Year(SalesDate), CustNo),
          Order By SalesYear, CustNo
```

SQL result type: Multi-row result set  
Trim mode for output fields: Trailing ▾

SQL state information in response: On errors  
Treat warnings as SQL Errors: Yes  
User-defined error message:

HTTP status code on SQL success: 200  
HTTP status code on SQL failure: 500

- HTTP status code on SQL Success:
  - Peut être modifié pour correspondre aux codes d'état HTTP standard, par exemple 201 chaque fois qu'une ressource est créée
- HTTP status code on SQL Failure:
  - Peut être modifié pour correspondre aux codes d'état HTTP standard, par exemple, 404 pour NOT FOUND (introuvable).

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## Déployer un nouveau service Web: Step 6 of 8

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Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

Web Services Deploy New Service Manage Deployed Services

Server Properties Properties View HTTP Servers

Security Logging View Logs View Create Summary

Tools Web Log Monitor Create Certificate Manage Certificates Create Keystore

Procedure name: SalesCust URI path template for resource: /Sales/(SalesYear\|d+)/(CustNo)

HTTP request method: GET URI path template for method: \*NONE or... ▾

HTTP header information: \*NONE

Allowed input media types: \*ALL or... ▾

Returned output media types: \*JSON or... ▾

Identifier for input wrapper element: SalesCustInput or... ▾

Identifier for output wrapper element: SalesCustResult or... ▾

Wrap input parameters

Input parameter mappings:

Parameter name	Data type	Input source	Identifier	Default Value
ParSalesYear	INTEGER	- Select -		*NONE or... ▾
ParCustNo	CHAR	- Select -		*NONE or... ▾

**Méthode de requête HTTP:**

- GET Recevoir des données
- PUT Modifier/Remplacer une ressource
- POST Créer une nouvelle ressource
- DELETE Supprimer une ressource

**Header Information – peuvent être ajoutées**



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## Déployer un nouveau service Web: Step 6 of 8

**IBM Web Administration for i**

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATEST03 - V2.6 (web services) ▾

Common Tasks and Wizards

Web Services Deploy New Service Manage Deployed Services

Server Properties Properties View HTTP Servers

Security Logging View Logs View Create Summary

Tools Web Log Monitor Create Certificate Manage Certificates Create Keystore

Procedure name: SalesCust URI path template for resource: /Sales/(SalesYear\|d+)/(CustNo)

HTTP request method: GET URI path template for method: \*NONE or... ▾

HTTP header information: \*NONE

Allowed input media types: \*ALL or... ▾

Returned output media types: \*JSON or... ▾

Identifier for input wrapper element: SalesCustInput or... ▾

Identifier for output wrapper element: SalesCustResult or... ▾

Wrap input parameters

Input parameter mappings:

Parameter name	Data type	Input source	Identifier	Default Value
ParSalesYear	INTEGER	- Select -		*NONE or... ▾
ParCustNo	CHAR	- Select -		*NONE or... ▾

**Types de médias d'entrée autorisés (si l'option Type de média SQL est définie):**

- For example: image/gif, application/pdf

**Types de médias de sortie retournés**

- \*XML
- \*JSON
- \*HTML
- \*XML, \*JSON
- \*XML, \*JSON, \*HTML



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## Déployer un nouveau service Web: Step 6 of 8

**Procedure name:** SalesCust  
**URI path template for resource:** /Sales/(SalesYear\d+)/(CustNo)  
**HTTP request method:** GET  
**URI path template for method:** \*NONE  
**HTTP header information:** \*NONE  
**Allowed input media types:** \*ALL  
**Returned output media types:** \*JSON  
**Identifier for input wrapper element:** SalesCustInput  
**Identifier for output wrapper element:** SalesCustResult

Wrap input parameters

Parameter name	Data type	Input source	Identifier	Default
ParSalesYear	INTEGER	*PATH_PARAM	SalesYear	*NONE
ParCustNo	CHAR	*PATH_PARAM	CustNo	*NONE

- Faut-il encapsuler les paramètres d'entrée ? :
  - Wrap par exemple Méthode PUT
  - Do not wrap par exemple Méthode GET
- Mappings des paramètres d'entrée – Source d'entrée
  - \*QUERY\_PARAM
  - \*PATH\_PARAM
  - \*FORM\_PARAM
  - \*COOKIE\_PARAM
  - \*MATRIX\_PARAM
  - \*TRANSPORT\_METADATA
  - \*NONE

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## Déployer un nouveau service Web: Step 6 of 8

**Procedure name:** SalesCust  
**URI path template for resource:** /Sales/(SalesYear\d+)/(CustNo)  
**HTTP request method:** GET  
**URI path template for method:** \*NONE  
**HTTP header information:** \*NONE  
**Allowed input media types:** \*ALL  
**Returned output media types:** \*JSON  
**Identifier for input wrapper element:** SalesCustInput  
**Identifier for output wrapper element:** SalesCustResult

Wrap input parameters

Parameter name	Data type	Input source	Identifier	Default
ParSalesYear	INTEGER	*PATH_PARAM	SalesYear	*NONE
ParCustNo	CHAR	*PATH_PARAM	CustNo	*NONE

- Source d'entrée = \*PATH\_PARAM:  
L'identifiant est automatiquement défini sur la base des noms des paramètres
- Source d'entrée = \*TRANSPORT\_METADATA  
Choisir le formulaire d'identifiant:
  - QUERY\_STRING
  - REQUEST\_METHOD
  - REQUEST\_URL
  - SERVER\_PORT
  - REMOTE\_ADDR
  - REQUEST\_URI
  - SERVER\_NAME

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## Déployer un nouveau service Web: Step 7 of 8

**IBM Web Administration for i**

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Running Server: BHATestSQL - V2.6 (web services)

Common Tasks and Wizards: Create Web Services Server, Create HTTP Server, Create Application Server

Web Services Wizards: Deploy New Service, Configure SSL, Disable SSL

Server Properties: Properties, Server Tracing, View HTTP Servers

Services: Manage Deployed Services

Problem Determination: View Logs, Web Log Monitor, View Create Summary

Specify User ID for this Service - Step 7 of 8

The service requires an IBM i user ID to run the Web service business logic. The user ID must have the necessary authority to any resources that the Web service requires.

Specify User ID for this Service: ?

Use server's user ID

Specify an existing user ID

User ID: QWSERVICEX

Update the server's user ID to have \*USE authority to this user ID.

Use authenticated user ID

**Exécuté par l'Id de l'utilisateur du serveur Webservice**

**Exécuté par un profil utilisateur particulier qui est autorisé à accéder à tous les fichiers et répertoires du service web**

**Exécuté par un profil utilisateur authentifié**

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## Déployer un nouveau service Web: Step 8 of 8

**Deploy New Service**

Summary - Step 8 of 8

When you click Finish the web service is deployed

Service Security JDBC Properties Methods

Resource name: BHAWSSQLTest

Resource description: Test WebServiceSQL

Service install path : /www/bhatest03/webservices/services/BHAWSSQLTest

URI path template: /Sales/[SalesYear:Id=]/[CustNo]

Service Security JDBC Properties Methods

User ID for this service: WSERVICEX

Protect using authentication method: \*NONE

Secure transport required: No

Database system: localhost

Default schema: \*LBL

Naming convention: \*SYS

Library List: Qtemp, comsqlqry, systools, qgpl

**Résumé**

- Si tout est bien, cliquez sur Finish
- Sinon, retournez et corrigez

Service	Security	JDBC Properties	Methods	
Procedure name:	SalesCust			
SQL Statement:	Select Year(SalesDate) SalesYear, CustNo, Sum(Amount) From ComSQLQry Sales Where Year(SalesDate) = ? and CustNo = ? Group By RollUp(Year(SalesDate), CustNo) Order By SalesYear, CustNo			
SQL result type:	Multi-row result set			
Trim mode for output fields:	Trailing			
SQL state information in response:	On errors			
Treat warnings as SQL Errors:	Yes			
User-defined error message:				
HTTP status code on SQL success:	200			
HTTP status code on SQL failure:	500			
HTTP request method:	GET			
URI path template for method:	*NONE			
HTTP header information:	*NONE			
Allowed input media types:	*ALL			
Returned output media types:	*JSON			
Identifier for input wrapper element:	SalesCustInput			
Identifier for output wrapper element:	SalesCustResult			
Input parameter mappings:				
Parameter name	Data type	Input source	Identifier	Default Value
ParSalesYear	INTEGER	*PATH_PARAM	SalesYear	*NONE
ParCustNo	CHAR	*PATH_PARAM	CustNo	*NONE

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## Services – Administrer les services déployés

**IBM Web Administration for i**

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATestSQL - V2.6 (web services) ▾

- Common Tasks and Wizards
  - Create Web Services Server
  - Configure SSL
  - Create Application Server
- Web Services Wizards
  - Deploy New Service
  - Configure SSL
  - Disable SSL
- Server Properties
  - Properties
  - Server Tracing
  - View HTTP Servers
- Services
  - Manage Deployed Services
- Problem Determination
  - View Logs
  - Web Log Monitor
  - View Create Summary
- Tools
  - Create Certificate
  - Manage Certificates
  - Create Keystore

**Manage Deployed Services**

Data current as of Apr 26, 2020 5:03:16 PM.

Deployed services: 12

Service name	Status	Type	Startup type	Service definition
BHATestSQL	Running	REST	Automatic	 View Swagger
BHAWPDF02	Running	REST	Manual	 View Swagger
BHAWSO1	Running	REST	Automatic	 View Swagger
BHAWSPDF	Running	REST	Automatic	 View Swagger
BHAWSPDF02	Running	REST	Automatic	 View Swagger
BHAWSPUT	Running	REST	Automatic	 View Swagger
BHAWSPicture	Running	REST	Automatic	 View Swagger
<b>BHAWSSalesCust</b>	Installing	REST	Automatic	 View Swagger
BHAWSSalesYear	Running	REST	Automatic	 View Swagger
BHAWSStrProc	Running	REST	Automatic	 View Swagger
ConvertTemp	Running	SOAP	Automatic	 View WSDL

**Buttons:** Deploy Properties Uninstall Redeploy Refresh

- Services Déployés
  - **BHAWSSalesCust est actuellement en train d'être installé**
  - **Cliquez sur Refresh**

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## Administre les services déployés

**IBM Web Administration for i**

Setup Manage Advanced | Related Links

All Servers | HTTP Servers Application Servers Installations

Server: BHATestSQL - V2.6 (web services) ▾

- Common Tasks and Wizards
  - Create Web Services Server
  - Configure SSL
  - Create Application Server
- Web Services Wizards
  - Deploy New Service
  - Configure SSL
  - Disable SSL
- Server Properties
  - Properties
  - Server Tracing
  - View HTTP Servers
- Services
  - Manage Deployed Services
- Problem Determination
  - View Logs
  - Web Log Monitor
  - View Create Summary
- Tools
  - Create Certificate
  - Manage Certificates
  - Create Keystore

**Manage Deployed Services**

Data current as of May 3, 2020 10:54:38 AM.

Deployed services: 12

Service name	Status	Type	Startup type	Service definition
BHATestSQL	Running	REST	Automatic	 View Swagger
BHAWPDF02	Running	REST	Automatic	 View Swagger
BHAWSO1	Running	REST	Automatic	 View Swagger
BHAWSPDF	Running	REST	Automatic	 View Swagger
BHAWSPDF02	Running	REST	Automatic	 View Swagger
BHAWSPUT	Running	REST	Automatic	 View Swagger
BHAWSPicture	Running	REST	Automatic	 View Swagger
<b>BHAWSSalesCust</b>	Running	REST	Automatic	 View Swagger
BHAWSSalesYear	Stopped	REST	Automatic	 View Swagger
BHAWSStrProc	Running	REST	Automatic	 View Swagger
ConvertTemp	Running	SOAP	Automatic	 View WSDL

**Buttons:** Deploy Start Properties Uninstall Redeploy Refresh

- **Serveur WebService:**

- **État: Running**
- **Change Status → Stop/Start**
- **Refresh**

- **Start/Stop: Démarrer/terminer le service Web**

- **Properties: Afficher la définition du service Web**

- **Uninstall: Supprimer le service Web (Definition)**

- **Redeploy: Modifier le service Web (Definition)**

- **Refresh: Actualiser la liste des services déployés**

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# Exemples

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## BHAWSSalesYear – Requête GET – Output JSON

### Service Properties

[General](#) [Methods](#) [Swagger](#) [Connection Pool](#) [JDBC Properties](#)

#### Service information

Resource Name: BHAWSSalesYear  
 Resource description: Accumulated Sales per Year/Customer  
 URI path template: /{SalesYear}  
 Startup type: Automatic  
 Service install path: /www/BHATestSQL/webservices/services/BHAWSSalesYear  
 Base resource URL: http://[REDACTED]/web/services/BHAWSSalesYear  
 User ID for this service: QWSERVICEX or...  
 Update the server's user ID to have \*USE authority to this user ID.

- Requête GET avec un seul paramètre et
- Output JSON

### Service Properties

[http://yourServer:YourPort/web/services/BHAWSSalesYear/2009](#)

[General](#) [Methods](#) [Swagger](#) [Connection Pool](#) [JDBC Properties](#)

#### Resource information for methods

Procedure name: SalesYearCust  
 SQL Statement: Select Year(SalesDate) SalesYear, CustNo, Sum(Amount)

HTTP request method:

GET

URI path template for method:

\*NONE

SQL result type:

Multi-row result set

Trim mode for output fields:

Trailing

SQL state information in response:

On errors

Treat warnings as SQL Errors:

Yes

User-defined error message:

HTTP status code on SQL success:

200

HTTP status code on SQL failure:

500

HTTP header information:

Allowed input media types:

\*ALL

Returned output media types:

\*JSON

Input parameter mappings:

Parameter name	Data type	Input source	Identifier	Default Value
ParSalesYear	INTEGER	*PATH_PARAM	SalesYear	*NONE

JSON		Raw Data	Headers
Save	Copy	Collapse All	Expand All
▼	Filter JSON		
▼ BHAWSalesYear_SalesYearCust_1:			
▼ 0:			/web/services/BHAWSSalesYear/2009
SALESYEAR:	2009	CUSTNO:	"100001"
CUSTNO:	100001	000001:	2634,2
▼ 1:			
SALESYEAR:	2009	CUSTNO:	"100002"
CUSTNO:	100002	000001:	1604,25
▼ 2:			
SALESYEAR:	2009	CUSTNO:	"100003"
CUSTNO:	100003	000001:	4509,86
▼ 3:			
SALESYEAR:	2009	CUSTNO:	"100004"
CUSTNO:	100004	000001:	2673,35
▼ 4:			
SALESYEAR:	2009	CUSTNO:	"100005"
CUSTNO:	100005	000001:	3741,95

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## BHAWSStrProc – Requête GET – Appeler une Stored Procedure

**Service Properties**

General Methods Swagger Connection Pool JDBC Properties

Service information

Resource Name: BHAWSStrProc  
Resource description: Call Stored Procedure  
URI path template: /{Search}  
Startup type: Automatic  
Service install path: /www/BHA/TestSQL/webservices/services/BHAWSStrProc  
Base resource URL: http://[REDACTED]/webservices/BHAWSStrProc  
User ID for this service: QWSERVICEX or...  Update the server's user ID to have \*USE authority to this user ID.

• Appeler une Stored Procedure renvoyant un Result Set

**Service Properties**

General Methods Swagger Connection Pool JDBC Properties

Resource information for methods

Procedure name: CallProcRS  
SQL Statement: Call GetCompany(?)  
HTTP request method: GET  
URI path template for method: \*NONE  
SQL result type: Multi-row result set  
Trim mode for output fields: Both  
SQL state information in response: On errors  
Treat warnings as SQL Errors: Yes  
User-defined error message:  
HTTP status code on SQL success: 200  
HTTP status code on SQL failure: 500  
HTTP header information:  
Allowed input media types: \*ALL  
Returned output media types: \*JSON  
Input parameter mappings:

Parameter name	Data type	Input source	Identifier	Default
ParSearch	VARCHAR	*PATH_PARAM	Search	*NONE

Save Copy Collapse All Expand All Filter JSON

BHAWSStrProc\_CallProcRS:

- ▼ 0: CUSTNO: "00230"  
CUSTNAME1: "OBI-Baumarkt AG"  
STREET: "Schillerstraße 38"  
COUNTRY: "D"  
ZIPCODE: "20045"  
CITY: "Hamburg"
- ▼ 1: CUSTNO: "10002"  
CUSTNAME1: "Herrmann & Bauer GmbH"  
STREET: "Unter den Linden 10"  
COUNTRY: "D"  
ZIPCODE: "75683"  
CITY: "Karlsruhe"
- ▼ 2: CUSTNO: "200012"  
CUSTNAME1: "Einbau-Küchen vom Feinsten"  
STREET: "Bachstr. 47"  
COUNTRY: "D"  
ZIPCODE: "63083"  
CITY: "Langen"
- ▼ 3: CUSTNO: "200045"  
CUSTNAME1: "Freilichtmuseum Tiroler Bauernhöfe"  
STREET: "Angerberg 10"  
COUNTRY: "A"  
ZIPCODE: "6233"  
CITY: "Kramsach"

<http://YourServer:YourPort/web/services/BHAWSStrProc/Bau>

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## BHAWSSalesYear – Requête GET – Output HTML

**Service Properties**

General Security Methods Swagger Connection Pool JDBC Properties

Service information

Resource Name: BHAWSHTML  
Resource description: Sales per Customer and Year / HTML  
URI path template: /{SalesYear}/{CustNo}  
Startup type: Automatic  
Service install path: /www/BHAWSSQL01/webservices/services/BHAWSHTML  
Base resource URL: http://[REDACTED]/web/services/BHAWSHTML

• WebService with HTML Output

Not Secure [http://\[REDACTED\]/web/services/BHAWSHTML/2009/10001](http://[REDACTED]/web/services/BHAWSHTML/2009/10001)

**BHAWSSHTML\_SalesCust\_R**

SalesYear	CustNo	ItemNo	Item	Total	Pos
2009	10001	5100	King,Stephen - Es	1374.35	9
2009	10001	5200	King,Stephen - Drei	363.20	2
2009	10001	5300	Grisham,John - Die Akte	896.65	4
				2634.20	15

<http://YourServer:YourPort/web/services/BHAWSSHTML/2009/10001>

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## BHAWSPicture – Requête GET – Renvoyant Media Resource

### Service Properties

General Methods Swagger Connection Pool JDBC Properties

Service information  
 Resource Name: BHAWSPicture  
 Resource description: Picture  
 URI path template: /{Id}  
 Startup type: Automatic  
 Service install path: /www/BHATestSQL/webservices/services/BHAWSPicture  
 Base resource URL: http://[REDACTED]:10012/web/services/BHAWSPicture  
 User ID for this service: QWSERVICEX or...  
 Update the server's user ID to have \*USE authority to this user ID.

- Renvoyer une image stockée dans une colonne CLOB d'une table Db2 pour i

<http://YourServer:YourPort/web/services/BHAWSPicture/1>

### Service Properties

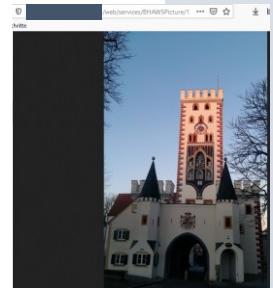
General Methods Swagger Connection Pool JDBC Properties

Resource information for methods  
 Procedure name: Picture  
 SQL Statement: Select Picture from ComSQLQry.Pictures  
 Where Id = ?

HTTP request method: GET  
 URI path template for method: \*NONE  
 SQL result type: Media resource  
 Trim mode for output fields: Trailing  
 SQL state information in response: On errors  
 Treat warnings as SQL Errors: Yes  
 User-defined error message:  
 HTTP status code on SQL success: 200  
 HTTP status code on SQL failure: 500  
 HTTP header information:  
 Allowed input media types: \*ALL  
 Returned output media types: image/jpg

Input parameter mappings:

Parameter name	Data type	Input source	Identifier	Default Value
Parid	INTEGER	*PATH_PARAM	Id	*NONE



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## BHAWSPDF02 – Requête GET – Renvoyant Media Resource

### Service Properties

General Security Methods Swagger Connection Pool JDBC Properties

Service information  
 Resource Name: BHAWSPDF  
 Resource description: Display PDF Documents in IFS  
 URI path template: /{Id}  
 Startup type: Automatic  
 Service install path: /www/BHATestSQL01/webservices/services/BHAWSPDF  
 Base resource URL: http://[REDACTED]:10012/web/services/BHAWSPDF

- Renvoyer un document PDF situé dans l'IFS

<http://YourServer:YourPort/web/services/BHAWSPDF/1>

### Service Properties

General Security Methods Swagger Connection Pool JDBC Properties

#### Resource information for methods

Procedure name: PDFFromIFS  
 SQL Statement: Values(Get\_Blob\_From\_File('/home/Hauser/PDF/PDFDocument\_0 concat ? concat '.pdf'))

HTTP request method: GET  
 URI path template for method: \*NONE  
 SQL result type: Media resource  
 Trim mode for output fields: Both  
 SQL state information in response: On errors  
 Treat warnings as SQL Errors: Yes  
 User-defined error message:  
 HTTP status code on SQL success: 200  
 HTTP status code on SQL failure: 500  
 HTTP header information: \*NONE  
 Allowed input media types: \*ALL  
 Returned output media types: application/pdf  
 Identifier for input wrapper element: PDFFromISInput  
 Identifier for output wrapper element: PDFFromISResult  
 Input parameter mappings:

Parameter name	Data type	Input source	Identifier	Default Value
Parid	VARCHAR	*PATH_PARAM	Id	*NONE



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# Des Questions?

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## Biographie brève: Birgitta Hauser

### Birgitta Hauser

Diplômée en gestion d'entreprise, Birgitta Hauser a d'abord travaillé plusieurs années dans le contrôle de gestion avant de se tourner vers la programmation (RPG) sur AS/400. Aujourd'hui, elle travaille encore quelque fois comme programmeur sur l' IBM i. Son travail se concentre toutefois sur la modernisation et l'optimisation des applications IBM i existantes, en particulier des bases de données, ainsi que sur l'intégration de nouvelles technologies.

Depuis 2020, Birgitta travaille à son compte et assiste ses clients dans des projets de modernisation d'applications et de bases de données et de l'optimisation des performances SQL sur l'IBM i et Db2 for i.

De plus, Birgitta donne régulièrement des cours pour des programmeurs IBM i (RPG/CL) et des spécialiste Db2 for i et des utilisateurs SQL.

Depuis 2002, Birgitta intervient régulièrement lors de conférences des COMMON User Groups en Allemagne, dans d'autres pays européens, ainsi qu'aux États-Unis et au Canada.

Birgitta est co-auteur de 2 IBM Redbooks, ainsi que de plusieurs articles spécialisés pour IBM DeveloperWorks and IT-Jungle. Elle écrit régulièrement des articles spécialisés (RPG/SQL) pour le ITP-Verlag (daison d'édition allemande)

En 2015, Birgitta a reçu la bourse d'études John Earl Speaker. En 2018, elle a reçu la bourse d'études commémorative Al Barsa.

Depuis 2020 elle est un IBM Champion.

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### Holger Scherer – RZKH Rechenzentrum Kreuznach

- Pour avoir offert un système IBM i permettant la création des exemples et du code utilisés dans mes présentations.
- <http://www.rzkh.de>



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## Références

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### Navigator for i – Documentation

- <https://www.ibm.com/support/pages/node/6483299>

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# Merci!

Services Web seulement avec SQL?

Yes i can!

Si vous êtes intéressé par des classes individuelles plus détaillées, sur place ou à distance,  
veuillez me contacter directement

**Birgitta Hauser – Modernization – Education – Consulting on IBM i**

Diplom-Betriebswirt (BA)  
Database and Software Architetct  
IBM Champion seit 2020

**eMail:** [Hauser@ModEdCon.com](mailto:Hauser@ModEdCon.com) / [Hauser@SSS-Software.de](mailto:Hauser@SSS-Software.de)  
**Web:** <https://modedcon.com/>



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