



# uniPaaS Server for IBM i V1.9g Release Notes

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## Dear Developer,

We are pleased to present you with the release of uniPaaS Server V1.9g for the IBM i platform.

Please read the information below to learn more about uniPaaS Server for IBM i V1.9g.

For information about uniPaaS V1.9g, see:

<ftp://ftp.magicsoftware.com/uniPaaSproduct/Documents/uniPaaS1.9gReleaseNotes.pdf>

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## General Information

uniPaaS for IBM i Server V1.9g lets you deploy uniPaaS applications directly on the IBM i server.

## Prerequisites

1. OS/400 V5R4 ,OS i 6.1, or OS i 7.1
2. OS/400 Private Address Space Environment (PASE) – IBM License program
  - 5722SS1 option 33 V5R4
  - 5761SS1 option 33 6.1
  - 5771SS1 option 33 7.1
3. IBM Java License program (see Java Requirements)
4. TCP/IP configuration for IBM i
5. TCP/IP Interface must be Active
6. Local Host name must be defined in the host table entries
7. Domain Name must be configured
8. Domain Name must be added to host table entries
9. Easycom Host Library
  - OS i V5R4 and 6.1: Host 1.1a or later
  - OS i 7.1 : Host 1.3

uniPaaS 1.9g has been tested with Host Library 1.3.

10. The User profile that will be used by the MGSERVER and MGBROKER jobs must have \*RWX rights for most of the IFS directories in the uniPaaS 1.9 installation. After the installation, it can be set using the following commands:

```
CHGAUT OBJ('/UNIPAAS19') USER(USERPRF) DTAAUT(*RWX) OBJAUT(*ALL)  
SUBTREE(*ALL).
```

Where USERPRF is a user name or user group profile that will be used for running the server jobs and UNIPAAS19 is the server directory.

11. When using the printing functionality of uniPaaS server for IBM i, make sure that the CCSID property of the user profile that runs the engine is not set to 65535. No output will be produced if you work with that CCSID.
12. When using graphical fields (Unicode) in your application, make sure that the user profile of the MGCLIENT job is not set to 65535.
13. Permanent or Evaluation License PAK



## Java Requirements

If you do not use any Java-based functionality in your application, it is possible to start uniPaaS engines without JVM load. The STRUNISVR command has a new parameter, **Load JVM**. If you use this parameter, there is no need to install any Java prerequisites.

Java license programs are required to be installed on your IBM i server only when the uniPaaS application is designed to utilize Java-based functionality. For example:

- Java functions
- Providing Web services
- Web Service consuming
- Using JMS – Java Messaging Server
- Using EJB – Enterprise Java Bean

**Below are the Java requirements according to the operating system level:**

### For V5R4

1. IBM Developer Kit for Java License program 5722JV1 Option \*Base
2. J2SE 5.0 32 bit – License program 5722JV1 Option 8
3. J2SE 6.0 32 bit – License program 5722JV1 Option 11
4. Java Group PTF SF99291 level 18 or later

### For 6.1

1. IBM Developer Kit for Java License program 5761JV1 Option \*Base
2. J2SE 5.0 32 bit – License program 5761JV1 Option 8
3. J2SE 6.0 32 bit – License program 5761JV1 Option 11
4. Java PTF Group SF99562 level 12 or later

### For 7.1

1. IBM Developer Kit for Java License program 5761JV1 \*Base Option
2. J2SE 5.0 32 bit – License program 5761JV1 Option 8
3. J2SE 6.0 32 bit – License program 5761JV1 Option 11
4. Java PTF Group SF99572 level 3 or later



## Installation

1. Execute the **unipaas1.9g\_iseries.zip** file in your PC's **temp** directory.
2. Extract the **UNI019000** file from the zip archive.
3. Copy the **UNI019000** file into any IFS directory of your IBM i server using one of the methods below:
  - IBM i Client Access
  - IFS Windows network sharing
  - FTP
  - NFS Share
4. Install the product using the **INSMSEPRD** IBM i command.
  - a. If you have previously installed MSEGPL library with INSMSEPRD command, type MSEGPL/INSMSEPRD from IBM i command line and press Enter.
  - b. If you haven't previously installed MSEGPL library with INSMSEPRD command, first follow the steps provided in the [Install MSE Product \(INSMSEPRD\) Tool](#) topic and then call MSEGPL/INSMSEPRD.
5. The Install MSE product display appears. At the Stream file prompt, specify the name of the STMF you downloaded in Step 4.
6. Fill in the **Installation Name** parameter, which is the name of the new Library and IFS directory. Example UNIPAAS19.
7. Fill in the root of the server's IFS directory. The default is **/**, which means that the server directory will be created in the IFS root. Example: /uniPaaS19.
8. Specify whether you need a CGI directory to be created in **/QOpenSys**. If you are planning to only use uniPaaS as a partitioning engine, then there is no need to create a directory in **QOpenSys**.
9. Fill in the **CCSID – ANSII** parameter, which is the CCSID of your environments. Example: 1252 for West European countries or 1250 for East European countries.
10. Sign off of your 5250 in order to clean QTEMP after the installation.

It is also possible to install the uniPaaS server without the INSMSEPRD command.

- a. Copy **UNI019000** to the IBM i save file (SAVF) using the File Transfer Protocol (FTP) in binary mode.
- b. Restore the content of save file into the **QTEMP** library.
- c. RSTOBJ OBJ(INSTALL\*) SAVLIB(PRODUCT) DEV(\*SAVF) OBJTYPE(\*ALL) SAVF(QTEMP/PART9999) MBROPT(\*ALL) ALWOBJDIF(\*ALL) RSTLIB(QTEMP)
- d. Run **QTEMP/INSTALL** and continue from step 6 above.



## Installation Components

### Library

- uniPaaS Server subsystem, Job Queues, Job Class, Job Descriptions, Message files, data areas
- CLLE interfaces to uniPaaS PASE environment, exit programs, service programs
- uniPaaS Server configuration menu (CFGMGCSVR) and relevant commands
- MGPRINT and MGPRINTC – Printing routine that converts IFS text based files to spool.

### IFS Directory

- uniPaaS Server (bin/unirte)
- uniPaaS Broker (broker/unirqbroker)
- uniPaaS command line requester (broker/mgrqcmdl)
- uniPaaS ISAM DB2/400 gateway (bin/mgeac/mgeacdbcs)
- uniPaaS SQL DB2/400 gateway (bin/mgdb400)
- uniPaaS memory gateway (bin/mgmemory)
- uniPaaS WS MQ gateway (bin/mgmqseries\_c)
- uniPaaS CGI requester (cgibin/mgrqcgi019)
- uniPaaS UDF/UDP examples (userproc directory)
- uniPaaS Web utility files used for Browser Client support (web\_utils directory)
- uniPaaS Hangul support (language/mglocal.kor)
- uniPaaS SNMP sub-agent (snmp/mgsnmp.so)
- uniPaaS Messaging component (messaging/messaging.ecf)
- Systinet server for Java (web\_services directory)

### CGI Directory in QOpenSys

- uniPaaS CGI requester (/QOpenSys/.../cgibin/mgrqcgi019)

This product includes software developed by the Apache Software Foundation (<http://www.apache.org/>).



## Configuration

You configure and manage the uniPaaS server using the Server administration menu.

Enter the following commands in the IBM i command line to invoke the uniPaaS Server administration menu:

1. Type **CHGCURLIB <New Library name>** and press **ENTER**.
2. Type **CFGMGCSVR** and press **ENTER**.

## Subsystem Configuration

1. Configure the uniPaaS server using **Magic Config/Magic Subsystem Config**. At this stage, **JOBQ MGSERVER** and a routing entry for the **MGSERVER** job are added to a selected subsystem description.  
**MGSERVER JOBQ** is a default **JOBQ** of the server jobs. When you start a server job using **STRUNISVR**, **STRMAGRUN** or **STRMAGINST**, the job is submitted to **JOBQ MGSERVER**. The routing entry sets a job class and a memory pool of the system main storage where the **MGSERVER** job is going to run. By default, it is set to **MGSERVER** job class and storage pool **1**.

The following job properties are controlled by the job class: Run priority, Time slice in milliseconds, Eligible for purge, Default wait time in seconds, Maximum CPU time in milliseconds, Maximum temporary storage in megabytes, and Maximum threads. You can manually change them during the job performance tuning by using the **CHGCLS** IBM i command. For example: **CHGCLS CLS(UNIPAAS19/MGSERVER) RUNPTY(XX) TIMESLICE(XXXX) CPUTIME(\*NOMAX) MAXTMPSTG(\*NOMAX) MAXTHD(\*NOMAX)**.

The routing entry is linked with a job description via the **Compare value** property of the routing entry and the **Routing Data** property of the job description. When the **MGSERVER** job enters the subsystem via **JOBQ**, the system validates the **Routing Data** of the job description against the **Compare value** of the routing entries in the subsystem. When the match is found, the job's memory pool is assigned and the relevant job properties are applied to the job according to the routing entry settings.  
**Make sure that the server subsystem is not active when you configure it via the menu.** For security reasons, this step is allowed only when the subsystem is not active. **Make sure that you do not have jobs pending in the job queue.**

As an alternative to the configuration menu, you can use the IBM i **ADDJOBQE** or **RMVJOBQE** and **ADDRTGE** or **RMVRTGE** commands for uniPaaS server configuration:



- a. Connect JOBQ to subsystem:  
**ADDJOBQE SBSDB(SBSLIB/SBSNAME) JOBQ(UNIPAAS19/MGSERVER) MAXACT(5)  
SEQNBR(10)**

Where:

**SBSLIB** – name of the subsystem library

**SBSNAME** – subsystem name

**UNIPAAS19** – name of the server installation

**5** – maximum number of concurrently active jobs

**10** – job sequence number in subsystem property. The next available number can be found using the WRKSBSD command:

**WRKSBSD SBSLIB/SBSNAME**

**option 5 (Display)**

**option 6 (Display Job Queue Entries)**

- b. Disconnect JOBQ from Subsystem:  
**RMVJOBQE SBSDB(SBSLIB/SBSNAME) JOBQ(UNIPAAS19/MGSERVER)**
- c. Add Routing entry:  
**ADDRTGE SBSDB(SVRLIB/SBSNAME) SEQNBR(10) CMPVAL(UNI19LB.MGRNT)  
PGM(QCMD) CLS(SVRLIB/MGSERVER)**
- d. Remove Routing entry:  
**RMVRTGE SBSDB(SVRLIB/SBSNAME) SEQNBR(10)**

2. If there's an error, verify the **joblog** using the **DSPJOB option 10**.
3. Configure the uniPaaS broker using **Magic Config/Broker Subsystem Config**.  
At this stage, **JOBQ MGBROKER** and a routing entry for the **MGBROKER** job are added to a selected subsystem description.  
**MGBROKER JOBQ** is a default job for the uniPaaS broker jobs. When you start a broker job using **STRMRBRUN**, the job is submitted to **JOBQ MGBROKER**. The routing entry sets a job class and a memory pool of the system main storage where the **MGBROKER** job is going to run. By default, it is set for the **MGBROKER** job class and storage pool **1**.  
The following job properties are controlled by the job class: Run priority, Time slice in milliseconds, Eligible for purge, Default wait time in seconds, Maximum CPU time in milliseconds, Maximum temporary storage in megabytes, and Maximum threads. You can manually change them during the job performance tuning by using the **CHGCLS IBM i** command.  
For example: **CHGCLS CLS(UNIPAAS19/MGBROKER) RUNPTY(XX) TIMESLICE(XXXX)  
CPUTIME(\*NOMAX) MAXTMPSTG(\*NOMAX) MAXTHD(\*NOMAX)**.





The routing entry is linked with a job description via the **Compare value** property of the routing entry and the **Routing data** property of the job description. When the **MGBROKER** job enters the subsystem via **JOBQ**, the operating system validates the **Routing Data** of the job description against the **Compare value** of the routing entries in the subsystem. When the match is found, the job's memory pool is assigned and the relevant job properties are applied to the job according to the routing entry settings.

**Make sure that the subsystem is not active when you configure it via the menu.**

For security reasons, this step is allowed only when the subsystem is not active.

**Make sure that you do not have jobs pending in the job queue.**

As an alternative to the configuration menu, you can use the IBM i **ADDJOBQE** or **RMVJOBQE** and **ADDRTGE** or **RMVRTGE** commands for uniPaaS broker configuration.

- a. Connect JOBQ to subsystem:

```
ADDJOBQE SBSDB(SBSLIB/SBSNAME) JOBQ(UNIPAAS19/MGBROKER) MAXACT(1)
SEQNBR(20)
```

Where:

**SBSLIB** – name of the subsystem library

**SBSNAME** – subsystem name

**UNIPAAS19** – name of the uniPaaS 1.9g installation

**1** – maximum number of concurrently active jobs

**20** – job sequence number in subsystem property. The next available number can be found using the **WRKSBSD** command:

```
WRKSBSD SBSLIB/SBSNAME
```

**option 5 (Display)**

**option 6 (Display Job Queue Entries)**

- b. Disconnect JOBQ from the Subsystem:

```
RMVJOBQE SBSDB(SBSLIB/SBSNAME) JOBQ(UNIPAAS19/MGBROKER)
```

- c. Add a Routing entry:

```
ADDRTGE SBSDB(SVRLIB/SBSNAME) SEQNBR(20) CMPVAL(UNI19LB.MGRNT)
PGM(QCMD) CLS(SVRLIB/MGBROKER)
```

- d. Remove a Routing entry:

```
RMVRTGE SBSDB(SVRLIB/SBSNAME) SEQNBR(10)
```

3. If there's an error, verify the **joblog** using the **DSPJOB option 10**.



## Setting the uniPaaS Configuration File (MAGIC400.INI)

1. MAGIC400.INI can be edited from IBM i command line or from any other text editor.
2. Do not copy any special characters. This may cause abnormal behavior in the product.
3. You can copy the database definition in the **MAGIC\_DATABASES** section from the MAGIC.INI file on Windows to the MAGIC400.INI file on IBM i.
4. It is highly recommended to backup the MAGIC.INI file before editing.

## FQDN (Fully Qualified Domain Name)

The broker and enterprise server should bind using a specific network adapter by specifying a FQDN (instead of an IP address). The requester layer should translate the FQDN to IP and bind using an IP on a specific adapter.

FQDN stands for fully qualified domain name – for example "Power6.mse.corp".

The MGREQ.INI file contains the following entry: BindFirstIPAddress=Y/[N].

- Y – During binding to a port, the server will resolve the host name and will bind to the resolved IP address.
- N – The server will bind to any IP address (\*.port – for backwards compatibility).

To enable a uniPaaS engine and broker to work with a specific network adapter (if there are multiple adapters on a machine):

1. Edit the MGREQ.INI file and enable **BindFirstIPAddress** (= Y) and set **MessagingServer** to **FQDN/port**.
2. Edit the MGRB.INI file and set **MessagingServer** to **FQDN/port**.
3. In the MAGIC.INI file, set **TCP/IP = 2, 30, 1500-2000 /LocalHost=FQDN**.
4. In the MAGIC.INI file, set the **Default Broker** to **FQDN/port**.

The table below shows the binding for the server module:

Port Number	V9.4sp6c-1 and above
Port-No	BindFirstIPAddress=N */Port-No BindFirstIPAddress=Y IP-address/Port-No
Ip Address/Port-No	IP-Address/Port-No



## HTTP Server (Powered by Apache) Configuration

1. Start the administrative server instance by issuing the following command:  
**STRTCPSVR SERVER(\*HTTP) HTTPSVR(\*ADMIN)**
2. Open the following URL to create the Apache instance:  
**http://<server\_name>:2001**
3. The Apache instance directory and its configuration files are created in the **/www** directory. Copy the lines contained in **UNIPAAS19/web\_utils/magic.conf** to the Apache configuration file.

**Note:** The **MGREQ.INI** file, which is used by Apache, is located in the same directory where the uniPaaS Internet requester program **mgrqcgi019** is located. The default location of the **MGREQ.INI** file and the uniPaaS Internet requester program **mgrqcgi019** is the **cgibin** directory.

## uniPaaS Requester Settings

The following settings in the MGREQ.INI file affect the requester execution:

### **RetryMainTime=nn (default: 5)**

The **RetryMainTime** setting determines the time interval that a requester connected to an alternate Request Broker should try to reconnect to the main Request Broker.

If the requester is already connected to the main Request Broker, the **RetryMainTime** setting does not apply. The time interval is specified in minutes.

For example, when **RetryMainTime=15**, the requester tries to reconnect to the main Request Broker every 15 minutes. When the main Request Broker becomes available, the requester connects to it and disconnects from the alternate Request Broker. If the main Request Broker becomes unavailable, the requester returns to the alternate Request Broker and tries to reconnect to the Main Request Broker every 15 minutes.

When **RetryMainTime=0**, the requester does not try to connect to the main Request Broker, but remains connected to the alternate Request Broker.

### **KeepAlive=Y\N (default: N)**

When **KeepAlive=Y**, the uniPaaS Generic Messaging Layer module lets the system administrator use operating-system level settings to control the keep-alive intervals for each open connection. Only a system administrator should determine the settings for the operating system intervals.



## Java Integration

The Java CLASSPATH separator character on IBM i platforms is a colon (:) as opposed to the Windows platform separator character, which is a semicolon (;).

For example: CLASSPATH = /java/MyClasses:/java/OtherClasses

For more information, please refer to the Java documentation:  
(<http://java.sun.com/j2se/1.5.0/docs/guide/javadoc/index.html>).

### For V5R4 only:

Make sure that you have installed Java Developer Kit (JDK) 1.5 or 1.6

To set Java 1.5/1.6 as your default Java:

- Specify **-Djava.version=1.5/1.6** on the Java command or in your **SystemDefault.properties** file; otherwise the Java will default to 1.4.

### For V5R4, 6.1 and 7.1:

You can run the 32-bit Java 1.5/1.6 by specifying the **JAVA\_HOME** environment variable.

## WebSphere MQ

uniPaaS 1.9g had been created and tested based on WMQ V6. On the IBM i platform, the WebSphere MQ connection can be established in the server mode only. IBM does not provide a “native” WebSphere MQ client.

If you are using a WebSphere MQ Queue manager on IBM i and you have to configure uniPaaS for communication with MQ, you need to set a logical name in the MAGIC400.INI file:

**WMQ\_ModuleName = C**

To connect to the WebSphere MQ Queue manager on another IBM I system or on any other platform, you have to interface with WebSphere MQ classes for Java using uniPaaS’s Java integration features.



## Using Colors in Browser Tasks

To properly use colors on IBM i, you must define all the colors that are used as non-system colors. The easiest way to do this is to access the color file in the uniPaaS Studio and define the colors accordingly.

## Browser Client

See the uniPaaS Help file for information about working with Browser Client programs.

## Server Initialization

As of uniPaaS V1.8SP1, there is a new command available for starting server engines: **STRUNISVR**. STRUNISVR is the only supported interface for starting uniPaaS server engines on the IBM i.



Please find below a list of server initialization parameters:

Parameter	Values	Type	Description
StartApplication	*INI, Path	Char 256	Project path
Environment File	*DFT, Path	Char 256	Path of the environment file (MGENV400)
INI File	*DFT, Path	Char 256	Path of the ini file
INI Modification (@) File Path	*NONE, Path	Char 256	Path of the @ file
Activate Requests Server	*Yes/*No	Char 4	Connect to broker
Server Instances to Start	Number 1 - 999	Dec 3	Number of engines to start
Log File Path:  Name  Directory			Path of the log file. No path validation is required.
ANSI CCSID	*DFT, Name	Char 5	Code Page of the IFS files
EBCDIC CCSID	*DFT, Name	Char 5	PASE CCSID
User Parameters	*NONE	Char 500	User string. This string is forwarded to the SBMSVRJOB CL program where it can be parsed and used for defining parameters of the SBMJOB, such as JOBNAME and *JOBQ.
Additional Parameters:  20 sets of three parameters			
INI Section	Name	Char 50	Name of the ini section
INI Entry	Name	Char 50	Name of the ini entry
Value	Name	Char 256	Value of the entry
Load JVM	*Yes/*No	Char 4	Load Java VM during initialization of the server instance.



## Open Source Exit Programs

uniPaaS for IBM i includes three open source exit programs where you can change the default settings of the uniPaaS server job.

1. **SBMSVRJOB** – An Exit program where the SBMJOB command is executed. By changing/adding exit program logic, you can control all of the SBMJOB parameters, such as Job Name, Job Queue, and Schedule Date/Time.  
The sources of this Exit program are located in the **SVRLIB/MGCLSRC** source file, where **SVRLIB** is the name of the server library.
2. **SVRJOBSTR** – An Exit program executed before loading the PASE environment. It is executed from the server job just before the load of the uniPaaS engine. It is useful for the development of additional error handling, settings of additional parameters and environment variables, sending system messages, etc.  
This Exit program has no source. It is empty by default.
3. **SVRJOBEND** – An Exit program executed after loading the PASE environment. It is called immediately after the uniPaaS engine is terminated while the IBM i server job is still active.  
It is useful for the development of additional error handling, collection of performance information, sending system messages, etc.  
This Exit program has no source. It is empty by default.

## Server Log File

The uniPaaS log file is created for each server instance. The log file name is set via the **ExternalLogFileName** entry in the MAGIC.ini file. The file path is absolute: **/New Library name/logs/LogFileName**

## New Features

### 1. New installation method via INSMSEPRD

This method lets you transfer the uniPaaS installation file into the IBM i server via IFS network share, FTP, IBM Client Access or NFS share.



## 2. New parameter in STRUNISVR: Load JVM \*Yes/\*NO

The Load JVM parameter lets you disable the load of JVM and therefore eliminates requirements of having IBM i Java license programs being installed on the system.

## 3. Start uniPaaS engine via MGRB.INI

You can now load uniPaaS server engines during the initialization of the uniPaaS broker. Example: By setting the following entry in the MGRB.INI you can load three uniPaaS server engines with different parameters.

```
[APPLICATIONS_LIST]
Port = STRUNISVR INIFILE('etc/TEST.INI') ACTRQSSVR(*YES) INSTCNT(3),UNIPAAS19,,,1,0
```

Three uniPaaS engines will start from the **UNIPAAS19** installation using **etc/TEST.INI**.

## 4. Performance Optimization

There is a 10-15% overall performance improvement in uniPaaS 1.9g compared to uniPaaS 1.9 (tested on the POWER6 and POWER7 servers).

## Fixed QCRs

**510743** – STRUNISVR did not correctly translate input parameters from the job's CCSID to the required CCSID (as specified in EBCCSID parameter) and to PASE, so that special characters, such as square brackets (characters '[' and ']') were not correctly relayed to the server's runtime.

\*\* This has been fixed; however, there is still a problem with Hebrew text.

**937367** – EndSession UDF led to an abnormal termination of the server instance.

## Limitations

1. Connectivity to messaging servers via JMS is not supported using the provided messaging component in this version.
2. The Broker Balancing feature is not supported in this version.
3. Encrypted Communication is not supported in this version.





4. If there is abnormal engine termination (ENDJOB, IPL, ENDSBS), there might be some spool files left by the server engine. The spool files are produced in the OUTQ of the server job user. To make sure that all these spool files are eventually removed from the system, set the OUTQ parameter of the relevant user profiles to the OUTQs that are included in the cleanup routine. For example: QUSRSYS/QEZJOBLOG.

## Licensing

As of uniPaaS V1.8 SP1, there is no need to install **easycom** licenses. The new license mechanism for the IBM i server is identical to Windows and UNIX. It is based on the **license.dat** file and license broadcasting. The valid license names for this version are:

1. **MGPART2** for the uniPaaS Partition Server
2. **MGENT2** for the uniPaaS Enterprise Server
3. **MGRIA** for the uniPaaS RIA Server

License errors are shown in the server log file.

The following are recommendations regarding licensing:

1. Activate server logging during server configuration and initial tests.
2. Make sure that you have a valid license file set in the **LicenseFile** and the **LicenseName** entries of the MAGIC400.ini file.
3. If you have multiple installations of the uniPaaS server on your system, maintain all the licenses in one directory.

## Recommendations

Back up all of the uniPaaS configuration files, such as MAGIC400.INI, MGRB.INI, and MGREQ.INI, before modifying them.

**Thank you,**

The uniPaaS IBM i Team